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AN INTERNATIONAL REVIEW DEVOTED TO THE HISTORY OF SCIENCE AND CIVILIZATION

FOUNDED AND EDITED BY GEORGE SARTON

Peter of Limoges and the Comet of 1299 ..... LYNN THORNDIKE

Franco de Polonia and the Turquet ..... LYNN THORNDIKE

Francis Sidney Marvin, 1863–1943 ..... CECIL H. DESCH

Magnitudes of Lunar Eclipses in Babylonian Mathematical Astronomy ..... O. NEUGEBAUER

History of Science in Sweden ..... STEN LINDROTH

Note sur la possibilité des répétitions cosmologiques ..... JACQUES DELEVSKY

Queries and Answers *Notes and Correspondence* *Reviews*

Critical Bibliography of the History and Philosophy of Science and of the History of Civilization

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PETER OF LIMOGES ON THE COMET OF 1299

By LYNN THORNDIKE

PETER OF LIMOGES, canon of Evreux, who refused two different bishoprics and twice declined a prebend in Paris,[1] is well known for his *De oculo morali*, of which there were several printed editions, for his collections of Parisian sermons,[2] and for his donation of 120 manuscripts to the Collège de Sorbonne,[3] of which he had once been a fellow. His death has been variously dated in 1304 and 1306.[4] HAURÉAU [5] and DELISLE [6] disagreed as to whether this canon could be identified with a PETER OF LIMOGES whose name appears in the records of the university of Paris in 1267 and 1270 as dean of the medical faculty.[7] SARTON [8] and WICKERSHEIMER [9] agree with HAURÉAU in answering this question in the negative, but there seems to be still room for doubt. *De oculo morali* describes eye diseases and their treatment as well as the eye itself. The library of the canon, bequeathed to the Sorbonne, included much medicine and astronomy and works by RAYMOND LULL.[10] It was not an unheard of thing then for an individual to study both medicine and theology, and while the Sorbonne was founded for students of theology, it was also limited to those who had already taken the degree of master of arts and to secular theologians as against members of the religious orders. One of its earliest benefactors, aside from king LOUIS IX and ROBERT DE SORBON himself, was the *physicus*, ROBERT OF DOUAI, canon of Senlis and physician to MARGUERITE OF PROVENCE, wife of LOUIS IX, who in 1258 gave 1500 livres for "the new scholars studying in theology." [11]

Whether our canon of Evreux had once been dean of the medical faculty or not, at any rate he enjoyed considerable repute in a field of learning which was then often closely related to medicine, namely, that of astronomy and astrology.[12] The obituary of him in the Sorbonne necrology called him "magnus astronomus," [13] while CLAUDE HÉMÉRÉ in his manuscript history of the Sorbonne said that PETER was renowned as an astrologer.[14] It is the primary purpose of the present note to call attention to a brief work by him in this field which seems not to have hitherto attracted notice, namely, a treatise on the comet of 1299 preserved in a Cambridge manuscript.[15] This little tract is the more important in that it appears to be the only one known upon the comet of that year. It has therefore seemed advisable to reproduce it here in full in both Latin text and English translation.

Before doing so, a word may be said concerning a treatise on nativities by a PETRUS DE LEMOVICIS in an Oxford manuscript [16] which has already been

[1] Sorbonne necrology, as quoted by LÉOPOLD DELISLE, *Le Cabinet des Manuscrits*, 1868–1881, 3 vols., II, 168: "Obiit magister PETRUS DE LEMOVICIS quondam socius huius domus canonicus Ebroicensis qui refutavit duos episcopatus et bis prebendam Parisiensem, baccalarius in theologia, magnus astronomus, qui legavit domui plus quam VI^{xx} volumina exceptis quibusdam caternis magne reputationis."

[2] HAURÉAU describes them as including sermons of ROBERT DE SORBON of the years 1260–1261, and others of 1261–1263 and 1272–1274 which PETER went from church to church collecting: *Histoire littéraire de la France*, XXVI, 461–2, 467. See further G. CLÉMENT-SIMON, "Notices de quelques manuscrits d'une bibliothèque limousine. Les Sermons de Pierre de Limoges," *Bull. soc. scient. Corrèze*, XV (1893), 299–317, 467–70.

[3] DELISLE, *op. cit.*, lists 57 odd now in the Bibliothèque Nationale, Paris. The legend which they bear, "Iste liber est pauperum magistorum de Sorbona ex legato magistri PETRI DE LEMOVICIS quondam socii domus huius," also appears in a thirteenth-century hand on the verso of the last leaf of a thirteenth-century manuscript of ALBERTANO DA BRESCIA, etc. offered for sale some time since by Chez Durtal, 12 rue Jacob, Paris (6^e).

[4] DELISLE gave 1304 and CHEVALIER prefers it to 1306, but HAURÉAU, SARTON, and WICKERSHEIMER give the latter.

[5] *Histoire littéraire de la France*, XXVI (1873), 460–67.

[6] *Le Cabinet des Manuscrits*, II, 167–69.

[7] *Chartularium universitatis Parisiensis*, I, 468, 488.

[8] *Introduction to the History of Science*, II (1931), 1029.

[9] *Dictionnaire biographique des médecins en France au moyen âge*, II, 645.

[10] DELISLE, *Le Cabinet des Manuscrits*, II, 169; *Histoire littéraire* XXVI, 463.

[11] *Chartularium universitatis Parisiensis*, I, 372–75; JAILLOT, *Recherches critiques, historiques et topographiques sur la ville de Paris*, 1782, Dix-huitième Quartier, S. André-des-Arcs, p. 138.

[12] It was also often regarded as having especially close connections with theology.

[13] See note 1 above.

[14] *Histoire littéraire*, XXVI, 463.

[15] Cambridge University Library 1767 (Ii. III. 3). I have obtained rotographs of portions of this MS. to be described below through the good offices of the librarian, Mr. A. F. SCHOLFIELD. PINGRÉ, *Histoire des comètes*, I (1783), 418, using notes which had been passed on to him by STRUYCK, and vaguely citing "Mss. Cantabr," briefly reproduced its observations of the position, course, and duration of the comet.

[16] Hertford College 4 (formerly Aula B. Mariae Magdalene 2). The numbering of the fols. of the MS. has also

briefly noted twice by me.[17] Because it was sandwiched in in the manuscript between treatises of the fourteenth century by JOHN OF SAXONY, JOHN OF MURS and JOHN DE LINERIIS and the early fifteenth-century work of JOHN DE RUBEIS, and because it seemed to include a nativity for 1389, I formerly suggested that it perhaps belonged to the closing fourteenth century. But the manuscript also includes such a work as the geomancy of BARTHOLOMEW OF PARMA composed in 1286, and the discussion of the nativity of 1389 may be a distinct tract or a later addition to what precedes it.[18] I am therefore now inclined to identify this PETER OF LIMOGES of the fifteenth-century Oxford manuscript with our canon of Evreux.

The Cambridge manuscript is dated 1276 in the printed catalogue,[19] but the tract on the comet of 1299 was composed after that event and is written in a hand of the closing thirteenth or early fourteenth century. It is hardly an autograph, since PETER's name is spelled "lemonicensi" instead of "lemovicensi." The catalogue fails to state any provenance for the manuscript or to make any distinction between the handwriting of its various component treatises. It is described as a parchment folio of 283 written leaves with 40 lines to the page and colored figures, but the tract on the comet of 1298 which occupies the last leaf is in double columns of 41 lines each. The previous contents comprise a calendar, tables of GARLANDUS, the *Computus manualis* of master BALDWIN DE MARROCCHIO,[20] the *Algorismus*, *Sphere*, and *Computus* of SACROBOSCO, the treatise on the quadrant which is sometimes attributed to ROBERTUS ANGLICUS but which here is ascribed to "master JOHN IN MONTPELLIER," [21] a Latin translation of MESSAHALA on the astrolabe, the *Theory of the Planets* which is commonly assigned to GERARD OF CREMONA,[22] several selections by THEBIT BEN CORAT, ALFRAGANUS on the stars and their motions, the *Tables* and *Canons* of ARZACHEL, the *Centiloquium* erroneously ascribed to PTOLEMY with the commentary of HALY, the *Quadripartitum* of PTOLEMY, and one or two anonymous notes and bits. None of the authors named was later than 1276.[23] I have not seen the manuscript itself but have a rotograph of the treatise on the quadrant and of the three works by SACROBOSCO as well as of that on the comet. The treatise on the quadrant and the last page of the tract preceding it and first page of that following it are in a slightly different and probably earlier hand than the last leaf on the comet, and are, as implied by the catalogue, in single column of forty lines to the page aside from variations produced by the introduction of figures and tables.[24] Our treatise on the comet of 1299 fills a trifle more than one double-columned page in the manuscript, running over to the extent of six and a half lines of text and two and a half of colophon into the first and left-hand column on the verso of fol. 283.

After stating the duration of the comet, PETER

been changed since it was described in COXE's *Catalogus codicum MSS. qui in collegiis aulisque Oxoniensibus hodie asservantur*, 1852, II.

[17] *A History of Magic and Experimental Science*, III, 601, note 70; *A Catalogue of Incipits of Medieval Scientific Writings in Latin*, 1937, cols. 507, 674.

[18] I should need to examine the MS. again more closely to tell. At fol. 159r a nativity is described, opening with the words, "In nomine, etc. Presupposito quod nativitas fuerit sub astro Virginis . . ." Then at fol. 160v a "work of master PETER OF LIMOGES on the aforesaid nativity" begins, "Si scis gradum astri in hora nativitatis, tunc non restat nisi equare domos et planetas . . ." The nativity for 1389 is being discussed at fols. 166v and 168r with accompanying figures and tables.

[19] *Catalogue of Manuscripts Preserved in the Library of the University of Cambridge*, Cambridge, 1856–1867, 5 vols.

[20] Or, DE MARDOCHIO. The catalogue calls him a twelfth-century writer from the Netherlands, perhaps because FABRICIUS, *Bibliotheca mediae et infimae latinitatis*, I (1734), 443, cites the *Bibliotheca Belgica* of ANTONIUS SANDERUS for Belgian codices of his works. He is not listed in SARTON's *Introduction*. Other MSS. of his *Compotus manualis* are: Bruges 522, 14th century, fols. 10v–16v; Florence, Laurentian, S. CRUCIS 18 sinis, 6, 14th century, fols. 11v–17r; Oxford, Bodleian, Tanner 192, 14th century, fols. 9–18; Paris, Bibliothèque Nationale latin 7420A.

[21] CU Ii. III. 3, fol. 56r, "Incipit tractatus quadrantis editus a Magistro IOHANNE IN MONTE PESSULANO."

[22] Opening, "Circulus eccentricus . . ."

[23] I do not know why the catalogue dated the MS. in 1276, but it may be worth recalling that TANNERY, "Le traité du quadrant de maître ROBERT ANGLÈS (Montpellier, XIIIe siècle): Texte latin et traduction grecque," *Notices et Extraits des MSS. de la Bibliothèque Nationale*, XXXV, ii (1897), 578, dated the treatise on the quadrant "avant 1276."

[24] In the case of the *Computus* of SACROBOSCO which ends on fol. 55v, ten lines of verse in very large letters are surrounded by forty lines of the text. Fol. 57v, in the midst of the treatise on the quadrant, is largely occupied by a fine figure of that instrument, roughly similar to that reproduced by TANNERY, *op. cit.*, p. 564, and by a smaller astronomical table, reducing the text to seventeen half lines. Figures in the margins which begin at fol. 59r impinge upon the space reserved for the text at the bottom of fol. 60v, which now has only 38 lines. The text appears to be complete, closing, ". . . per eius altitudinem et productum dabit capacitatem," as in TANNERY, but two more lines, which would have been the 39th and 40th, appear to have been erased and perhaps contained a colophon. Unfortunately they are illegible in the rotograph and further obscured by the figures. On the opposite page, fol. 61r, more than half of a large circular figure has been similarly obliterated to make way for the text of the work of MESSAHALA on the astrolabe.

describes its appearance briefly and classifies it as the variety known as Ascone. He then traces its course according to observations of its position made with the astronomical instrument called *turquetum*, another instance showing that it was well known in Christian western Europe long before REGIOMONTANUS.[25] He next attempts to explain its movement by the attraction exercised upon it by planets, particularly Mars and Mercury. Finally he indulges more briefly in a short paragraph of astrological prediction from it and in another paragraph of affirmation that God may alter these significations as He sees fit.

LATIN TEXT

Anno domini M°. CC°. nonagesimo. viii°,[26] ante finem ianuarii et toto februario et aliquot diebus marcii apparuit cometa modici corporis, caude longe iuxta sui corporis quantitatem, coloris parum vergentis ad ceruleum. per quod estimo quod fuit species illa comete que vocatur dominus ascone, quod in arabico et in ebraico idem significat quod dominus mortis in latino. apparebat enim in occidente ortum habens vespertinum et inventus est locus eius in sue appariciones inicio per turquetum xviii gradus tauri per circulum transeuntem per polos zodiaci, et habebat latitudinem meridianam ad ecliptica plusquam xxx gradibus. post festum vero sancti mathie inventus est locus eius xiiii gradus tauri et latitudo meridiana v gradus. ulterius etiam visa est usque ad v diem marcii diminuta multum in corpore et in cauda. et superascendebat versus plyades et aldebaran ad septentrionem ita quod motus eius semper maior fuit ad septentrionem quam ad occidens respectu stellarum fixarum. Motu igitur vario ferebatur et multiplici. ratione enim sue generationis loci que est superior pars aeris que est contigua spere ignis situaliter movebatur ab oriente in occidens. sic enim moventur superiora elementa per motum orbis. Sed quia ignis et superior pars aeris moventur tardius motu orbis, ideo si cometa in parte superiori aeris generata per solum motum orbis ad occidens movere[n]tur, post stellas fixas versus oriens remaneret et sic ex retardatione sola in contrarium motus orbis videtur moveri sicut etiam in quibusdam planetis. Quod autem velocius orbe moveretur ad occidens, hoc ideo erat quia a principali generante, mercurio videlicet, ad occidens fortissime trahebatur, qui ab inicio apparitionis comete locum[27] eius aspiciebat trino aspectu. et quia mercurius erat ab ea occidentalis per longitudinem et septentrionalis per latitudinem, ideo motus tractus solis movebatur ad septentrionem et occidens mutando situm respectu (col. b) stellarum fixarum. mars autem erat particeps cum mercurio, quod ex hoc patet quia cauda comete que in principio apparitionis respiciebat caniculam, paulatim elevabatur ad septentrionem corpore ipsius comete respectu caude sue meridiano manente quousque martem secundum rectam lineam cauda respexit. propter hoc ergo patet quomodo cometa magis movebatur ad septentrionem quam ad occidens respectu stellarum fixarum, cum utrumque motum quasi per modum tractus haberet, quia in motu comete ad occidens solus mercurius erat causa qui erat occidentalis

TRANSLATION

In the year of the Lord 1299, before the end of January and all through February and for some days in March, appeared a comet of moderate size with a long tail for the size of its body, of a color somewhat bordering on dark blue, from which I infer that it was the variety of comet known as Lord Ascone, which in Arabic and in Hebrew means the same as Lord of Death in Latin. For it appeared in the west, becoming visible in the evening, and when it first appeared its position as determined by a *turquetum* was in the 18th degree of Taurus on a circle passing through the poles of the zodiac. And it had a southern latitude to the ecliptic of more than 30 degrees. But after the feast of St. Matthew[28] its position was found to be the 14th degree of Taurus and its southern latitude 5 degrees. It still remained visible until the fifth day of March, much diminished in body and in tail, and it kept rising towards the Pleiades and Aldebaran to the north, so that its motion was always greater northward than westward with respect to the fixed stars. Therefore it was borne by varied motion and in manifold wise, for the place of its generation, which is the upper part of the air contiguous to the sphere of fire, was moved from east to west, for thus the superior elements are moved by the motion of the heavens. But since fire and the upper air are moved more slowly than the movement of the heavens, therefore if a comet generated in the upper air were moved westward by the motion of the heavens only, it would lag towards the east behind the fixed stars and so from mere retardation would seem to move in the opposite direction from the heavens, as is the case with certain planets. Now the fact that it was moved westward faster than the heavens was because it was very strongly drawn westward by its principal generating force, Mercury, which from the beginning of the comet's appearance was in trine aspect to it, and because Mercury was west of it in longitude and north of it in latitude. And so the traction of the sun(?) was moved northward and westward changing position with reference to the fixed stars.

Moreover, Mars was sharer with Mercury, which is shown from this, that the tail of the comet which, when it first appeared, was directed towards the lesser dog-star, gradually was raised to the north, while the body of the comet remained southward with reference to its tail, until the tail pointed to Mars in a straight line. This makes it clear how the comet moved more to the north than to the

[25] Compare the reference to it by JOHN DE MURS in 1318 (LYNN THORNDIKE, *A History of Magic and Experimental Science*, III, 295) and the treatise on it by FRANCO DE POLONIA (not of Liége or Cologne) which dates back to an exemplar of 1284 at least and is extant in many manuscripts of the fourteenth and fifteenth centuries. See the paper on FRANCO in this issue, pp. 6–7.

ab ea; in motu vero ad septentrionem causa erant simul mars et mercurius cum uterque septentrionaliter exiret a cometa.

Hiis itaque se habentibus dico secundum doctrinam astronomie iudicialis quod cometa huiusmodi significat bella guerras egritudines futuras seu scabiem et pruritum mortalitatem hominum et animalium propter aeris corruptelam ventos multos et validos terremotus magnos in aliqua parte terre multitudines pluviarum frigus vehemens in tempore hyemali defectum et carentiam victualium corruptionem messium et fructuum arborum et casum earundem. Et quia multis diebus duravit impressio, designatur et ipsius accidentia fore diutius duratura. Quia vero in coniunctione precedente introitum solis in arietem cometa fuit intra radios veneris et circa finem sue operationis quasi corporaliter iuncta cum ea, quia etiam in principio sue operationis iupiter locum eius aspiciebat aspectu sextili, hec inquam ipsius comete maliciam poterunt mitigare. propter constellationem aliquam etiam subsequentem predicta accidentia intendi poterunt vel remitti.

Illud sciendum firmeque tenendum quod divina potentia non est istis signaculis alligata quin simpliciter valeat signaculorum potentiam secundum suum beneplacitum vel totaliter vel in parte immutare. Sperandum est etiam quod et ea, si iuste vixerimus, immutabit. Ipse est (fol. 83v) etenim misericors deus noster qui per Ieremum dicit, A signis nolite metuere que gentes timent. Gentes enim, id est, gentiliter viventes possunt ista merito eciam formidare. Sed plerumque divina clementia propter iustorum merita misereri iniustis et parcere consuevit.

Explicit iudicium de stella cometa a Magistro PETRO LEMONICENSI canonico ebroicensi.

Columbia University
New York

[28] PETER apparently followed the Parisian custom of not beginning the new year until Easter.
[29] The MS. has *locus*.
[30] February 24.

west with reference to the fixed stars, although it had a double motion by which it was drawn. Since in the westward movement of the comet Mercury alone was the cause which was west of it. But in the movement to the north Mars and Mercury were a cause simultaneously, since both were to the north of the comet.

These things being so, I say according to the doctrine of judicial astrology that a comet of this sort signifies wars, conflicts, future diseases or scab and itch, mortality of men and beasts from corruption of the air, many violent winds, great earthquakes in certain parts of the earth, excessive rains, vehement cold in winter time, failure and scarcity of victuals, rotting of crops and of the fruit of trees, and destruction of the same. And because the phenomenon has lasted for many days, it indicates that its sequels will be of long duration. But since in the conjunction preceding the vernal equinox the comet was within the rays of Venus and at about its finish was in close conjunction with her, since also when the comet first appeared Jupiter was in sextile aspect to it — these circumstances, I say, may mitigate the ill effects of the comet. Also by reason of some subsequent constellation the sequels of the comet may be either intensified or diminished.

This should be known and firmly believed, that divine power is not fettered by those petty signs, nay He absolutely is able to alter their power according to His good pleasure in whole or in part. Also it is to be hoped that He will change them, if we shall have lived aright. For our God is merciful who speaks through Jeremiah, Fear not those signs which the Gentiles fear.[29] For the Gentiles, that is, those living a worldly life, may well fear them. But oft divine clemency on account of the merits of the just is wont to pity and spare the unjust.

So ends the judgment as to the comet star by master PETER OF LIMOGES, canon of Evreux.[30]

[29] *Jeremiah*, X, 2.
[30] Since writing this article, I have found other unpublished and practically unknown treatises on comets which, together with those mentioned in vols. I and II of *A History of Magic and Experimental Science*, I hope soon to edit in a volume on *Latin Treatises on Comets between 1238 and 1368 A.D.*

FRANCO DE POLONIA AND THE TURQUET

By LYNN THORNDIKE

FRANCO OF POLAND (de Polonia) who was probably of the thirteenth century, rather than FRANCO OF LIÉGE of the eleventh century or FRANCO OF COLOGNE (de Colonia) who wrote on musical matters in the twelfth century,[1] was the author of what seems the earliest treatise in Latin on the astronomical instrument known as *torquetum* or *turquetum*.[2]

[1] *Ars cantus mensurabilis*, ed. E. DE COUSSEMAKER, *Scriptorum de musica medii aevi novam seriem a Gerbertina alteram collegit nuncque primum edidit*, Paris, I (1864), 117–36; *Compendium discantus*, *ibid.*, 154–56; see also *ibid.*, 383–403, ROBERTI DE HANDLO, *Regulae cum maximis magistri Franconis cum additionibus aliorum*.

[2] GEORGE SARTON, *Introduction to the History of Science*, II (1931), 1005, also notes Arabic accounts of the turquet.

Manuscripts of this tract are numerous, fourteen having been listed by ZINNER in German libraries alone,[3] and others existing in Paris, London, Oxford and elsewhere.[4] So far as I know, these extant manuscripts are of the fourteenth and fifteenth centuries, but they derive from an exemplar of 1284 at least,[5] and possibly the original composition was still earlier. The turquet was employed by PETER OF LIMOGES, canon of Evreux, in observing the comet of 1299,[6] and JOHN DE MURS in 1318 mentioned it in the same breath with the astrolabe as examples of familiar astronomical instruments.[7] In view of such passages and the numerous and widespread manuscripts of FRANCO's tract from the fourteenth and earlier fifteenth centuries, it becomes evident that the notion that REGIOMONTANUS was chiefly responsible for the use of the turquet in western Latin Europe[8] must, like a number of other claims made for that worthy, be abandoned.

The tract of FRANCO was printed some twenty years ago, but without identifying its author, from an Ashmole manuscript at Oxford where it was anonymous, with reproduction of figures of the instrument.[9]

The turquet was also used in observing the comet of 1301, as we learn from an anonymous tract on it, which there is some reason for thinking was also by PETER OF LIMOGES and which is preserved in a Cambridge manuscript.[10]

[3] ERNST ZINNER, *Verzeichnis der astronomischen Handschriften des deutschen Kulturgebietes*, Munich, 1925, Nos. 2787–2800.

[4] A few of these are listed by THORNDIKE and KIBRE, *A Catalogue of Incipits of Medieval Scientific Writings in Latin*, 1937, col. 179.

[5] Geneva Latin MS. 80 (149), fols. 22r–24r: ending, "Deo gratias factum anno Domini 1284 secunda die Iulii in die dominica sole existente 11° Cancri." See also at Paris, Bibliothèque Nationale, Latin MS. 7197, item 3.

[6] See the paper on PETER in this issue, pp. 3–6.

[7] LYNN THORNDIKE, *A History of Magic and Experimental Science*, III (1934), 295.

[8] SARTON, *op. cit.*, should be modified on this point.

[9] R. G. GUNTHER, *Early Science in Oxford*, II (1923), 35–36, 370–75.

GUNTHER said, "The author of the treatise is still unknown to me," and gave the incipit of the tract as "De omnibus partium instrumenti . . ." instead of "De nominibus partium instrumenti . . ."

[10] Pembroke College 227, pp. 221a–222b. Mr. ELLIS H. MINNS, Acting Librarian, through whose good offices I procured a photostat of this and other tracts on comets in this MS, has further written me, ". . . it may interest you to know that 19.vii.23 ALEXANDER BIRKENMAJER, Librarian of Cracow University, examined the MS., pointed out its connexion with Kk.iv.7, and remarked that it contained the first mention of a Turquetum." But PETER's mention in 1299, found in yet a third Cambridge MS (University Library Ii.III.3) which BIRKENMAJER apparently did not see, is earlier.

FRANCIS SIDNEY MARVIN, 1863–1943

By CECIL H. DESCH

FRANCIS SIDNEY MARVIN, who died at Barnet, near London, on November 14th, 1943, in his eighty-first year, did much to improve the teaching of history in English schools and to encourage an interest in historical studies, with special emphasis on the importance of including the development of science in the presentation of history. He was the son of FRANCIS BENTHAM MARVIN and his wife JULIA CHASE, and was born in the City of London on August 6th, 1863. He was educated at the Merchant Taylors School in London and at St. John's College, Oxford, where he graduated with a first class in Greats (Classics) and a second in Modern History. For a time he taught in an elementary school, and the experience gained there was of use to him in his later efforts in educational reform. In 1890 he entered the service of the Board of Education as an Inspector of Schools, a position which he held until 1924, reaching the grade of Staff Inspector. The post involved residence successively in several towns in England. His special interest was in history, and from 1915 onwards he organized many courses of lectures for teachers and others. After retiring the promotion of the study of history became his chief occupation, and he devoted himself largely to furthering the work of the Historical Association, founding many branches throughout the country and taking great pains to encourage them, paying frequent visits to local branches and giving many lectures. For the session of 1929–30 he occupied the chair of Modern History in the University of Cairo, Egypt. The League of Nations Union was another body to whose work he gave much time and energy, and it was in connection with it that he went on a lecturing tour in India in 1925–26, one result of which was a book on *India and the West* (Long-

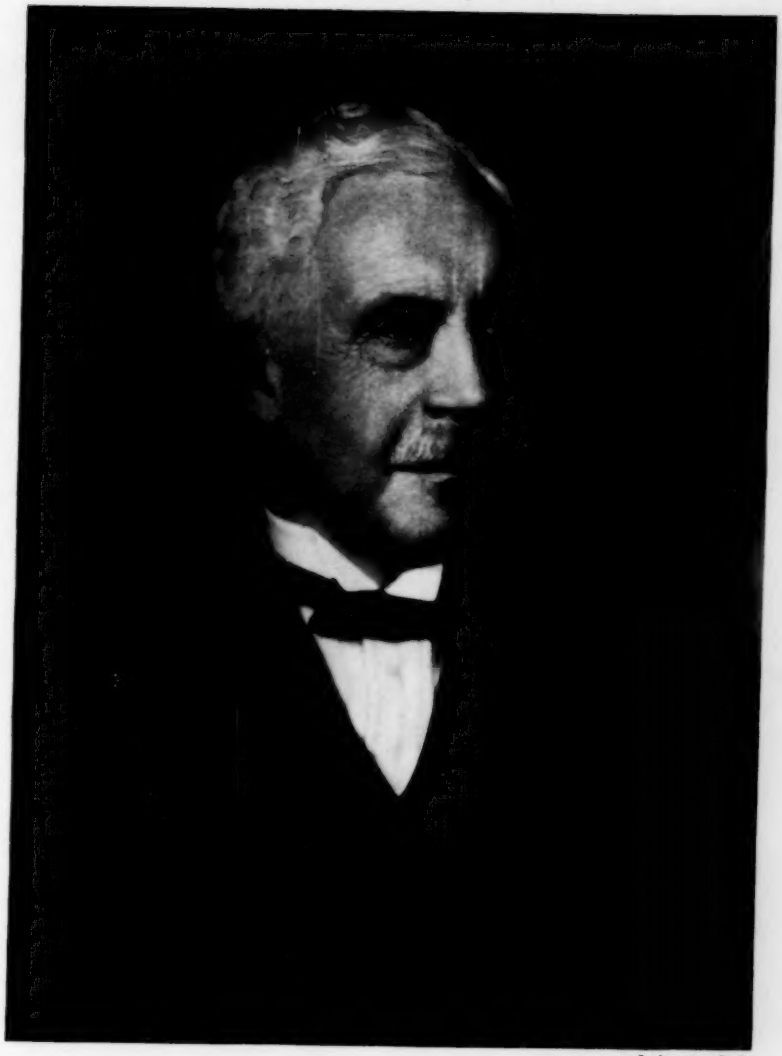
mans, 1927), with the sub-title *A Study in Co-operation*, which indicates its aim.

MARVIN became early associated with the Positivist group in London. Its leaders at that time were Oxford men trained in the classical tradition, concerned with the application of the teaching of AUGUSTE COMTE to social and political questions. The group included a number of men of high intellectual capacity, and it acquired an influence on public opinion, especially in the field of foreign policy, out of proportion to its small numbers. One of its members, JOHN HENRY BRIDGES, who had taken up medicine as his profession, had an essentially scientific mind, and his edition of the *Opus Majus* of ROGER BACON was the first essay of that school in the history of science in other than a popular manner. MARVIN became an active member of the group, and from 1893 to 1925 he contributed 101 articles to the *Positivist Review*. All his writings show the influence of COMTE's teaching, and he did much to make that teaching known to English readers, but he was never a Comtist in the sense of accepting COMTE's doctrines without question, and in his later years he became more and more critical of conclusions which some of his colleagues had regarded as essential parts of the doctrine they had accepted, whilst he held firmly to the main guiding principles of the positive philosophy.

In the small volume which he contributed to the series of Modern Sociologists (*Comte*, Chapman and Hall, 1936) he suggested that in three directions COMTE had contributed ideas which, if he did not originate them, gained greater precision and wider acceptance as the result of his work. The first of these was the conception of Humanity as an ideal, embodying something more than the mere sum of human generations, as that of Country embodies more than the sum of its citizens. The idea dates from CICERO, but the modern belief in progress has so greatly modified and widened it that its presentation by COMTE came as a new and fertile conception. COMTE's second achievement was the establishment of sociology as a distinct branch of science, more general than the special studies of ethnology, economics, history of religions, etc., and able to rank with the other general sciences. His chief predecessors had been VICO, TURGOT, and CONDORCET, but none of these had attempted so wide a sweep or had so clearly perceived the relation of the social to the physical and biological sciences. His central principle was that the evolution of mind should be the primary study of sociology. The third master-thought of COMTE was the insistence on the need for synthesis as essential to the further progress of science.

MARVIN's views on the importance of the history of science were summed up in an article on *Science and the Unity of Mankind* which he contributed to the second volume of the *Studies in the History and Method of Science* edited by CHARLES SINGER (Oxford University Press, 1921). Welcoming as he did the establishment of the League of Nations, he sought to show how the progress of science, which only became possible when organized human societies on a fairly large scale had come into existence, had contributed to the realization of the essential unity of the human race. The League, which at that time seemed to promise so much of good, was concerning itself with the teaching of history as a means of reaching better international understanding, and the aim of the article was to show, by reference to the position of science in classical, Renascence, and modern times, how necessary it was that the history of science should be taught as an essential part of world history.

The idea of the series of Unity History Schools arose at a meeting of the London Adult School Union at Jordans, the Friends' Settlement in Buckinghamshire adjoining the little graveyard in which WILLIAM PENN lies buried. The meeting happened to coincide with the outbreak of the European War in August 1914. It seemed to those present that in such a world cataclysm attention should be called to those forces which, in spite of wars, had been building up a world community, and MARVIN undertook to organize a summer school on those lines. The first of these schools was held at the Friends' Settlement at Woodbrooke, near Birmingham, in August 1915. The theme was "*The Unity of Western Civilization*," and it determined the name and the general tendency of those which followed it. MARVIN was very successful in securing the help of experts in dealing with the several aspects of a subject. The papers presented to this and succeeding summer schools were published by the Oxford University Press. In 1916 the subject was "*Progress and History*," and the volume containing the report proved to be the most popular of the series. War difficulties prevented another meeting until 1919, when the subject was "*Recent Developments in European Thought*." The 1920 meeting was held in conjunction with the League of Nations Union and dealt with "*The Evolution of World Peace*." The problem of mandated territories was urgent, and the 1921 meeting considered "*Western Races and the World*," with special reference to the more backward peoples. In 1922 the topic was "*Science and Civilization*," when for the first time workers in science contributed most of the papers, and whilst



Lafayette Ltd.

FRANCIS SIDNEY MARVIN

UNIV. OF MICH.

CHARLES SINGER, J. L. MYRES, A. N. WHITEHEAD, J. L. E. DREYER and others dealt with the history of special sciences, JULIAN HUXLEY and J. ARTHUR THOMSON were among those who considered the place of science in human affairs in modern times. In 1923 the school met for the first time abroad, when "*Art and Civilization*" was discussed in Vienna. There was then an interruption of some years, and the next volume to be published was on "*The New World Order*," containing reports of meetings held at Danzig in 1929 and at Stockholm in 1931. This volume proved to be the last of the series, although the schools continued to be held, meeting at Prague in 1933 and at Bath in 1934.

The last occasion on which the Unity History School met abroad was at Easter, 1935, when a meeting was held in Rome, in collaboration with the Department for the History of Science in that University. The meetings were in the splendid home of the R. Accademia dei Lincei in the Orsini Palace. The topic was "Science in the Modern World," and much help was given by Profs. FEDERICO HENRIQUES and G. DIAZ DE SANTILLANA. The contributions, which came from France, Czechoslovakia, and India, as well as England and Italy, were to be published shortly after in Rome, but the outbreak of the war with Abyssinia and the intensification of Fascism which led to our two principal hosts becoming exiles, prevented this. Two of the papers dealt with astronomy, and a feature of the meeting was a demonstration of a Zeiss Planetarium, the circular enclosure of which was ancient Roman work.

The Unity Schools continued to meet, at Farnham Castle in 1937, and then, in 1938 and 1939, once more at the Friends' Settlement at Jordans. On these later occasions, when the papers were not printed, the discussions were less formal, and the attendance of representatives of several schools of philosophy was responsible for the choice of subjects, which included the relations between science, philosophy, and religion. The meetings attracted many experts, and the common life in a hostel for several days gave opportunities for friendly discussion which those who attended remember with pleasure.

Of MARVIN's writings that which had the widest influence was *The Living Past*, first published by the Clarendon Press in 1913. In less than 300 pages he gave a masterly outline of Man's history from the Stone Age to the end of the 19th century, remarkable for its clarity and conciseness. Keeping always in view the general course of the evolution of society, he was able to indicate the development of ideas in their relation to the state of social organization, naturally avoiding minute detail but without falling into superficiality. The book, which differed markedly from ordinary political histories, passed through several editions and deserves to be well known. At a dinner in honour of MARVIN's 70th birthday, Mr. H. G. WELLS declared that it was this little book which suggested to him the writing of his *Outline of History*.

A sequel to *The Living Past*, with the title of *The Century of Hope*, was issued by the same publishers in 1919, being a sketch of Western Progress from 1815 to the outbreak of the first World War. The political sections of this book were inevitably nearer to form of a condensed text-book, but the prominence given to the intellectual and moral factors in the development of Western society was as conspicuous as in its predecessor. MARVIN's training had been humanistic, not scientific, but his wide reading and his close contact with scientific colleagues made him an admirable exponent of the leading ideas of modern science. In spite of the set-back to progress caused by the first World War, the volume closed on a note of optimism, looking to growing internationalism as the result of the co-operation of thinkers and moral reformers throughout the world. In 1919 that optimism seemed justified — disillusion came later, but MARVIN was one of those who never lost hope in the final triumph of right over wrong. His *New Vision of Man* (Allen and Unwin, 1938) is an eloquent proclamation of that belief. His experience in the organization of education led him to publish a useful little work: *The Nation at School* (Oxford Univ. Press, 1933). He took an active part in the work of the Sociological Society and of its successor, the Institute of Sociology. He also frequently contributed reviews of books on sociology and on the history of science to the columns of *Nature*. His contributions to the volumes of the Unity History Series usually included a lucid and suggestive summing-up of the conclusions reached by his collaborators, and he wrote many of the lives of Greek and Roman writers in the *New Calendar of Great Men* which was edited by his friend FREDERIC HARRISON and first published in 1892 (Macmillan).

MARVIN married, in 1904, EDITH MAY DEVERELL, and had three sons, one of whom died early. His body was cremated on Nov. 19th, 1943, at Golders' Green.

STUDIES IN ANCIENT ASTRONOMY. VII.*
MAGNITUDES OF LUNAR ECLIPSES IN BABYLONIAN MATHEMATICAL ASTRONOMY

By O. NEUGEBAUER

1. When F. X. KUGLER's monumental work "Die Babylonische Mondrechnung" appeared in 1900, it presented for the first time an insight into the methods and achievements of Babylonian astronomy of the Hellenistic age. Continued research made it increasingly clear that the Babylonian lunar theory is equalled only in the best works of Greek mathematical astronomy. The results reached in the present article point in exactly the same direction. It is the purpose of this study to show that several features in the Babylonian theory of eclipses are the results of a common methodological idea which in itself is of great historical interest.

It is not my intention to give an account here of all the steps leading from KUGLER's initial discoveries to the present results. It need only be recalled that KUGLER already recognized the existence of two different methods for the computation of lunar ephemerides: an older one, here called "System A," and a more recent "System B."[1] KUGLER's investigations concentrated for the most part on System B, because he had at his disposal an almost complete ephemeris for the new moons of two years computed according to System B. As to System A, the available ephemerides were in such a bad state of preservation that he was forced to restore the main features of System A from a text for lunar eclipses which naturally gave only the elements at intervals of six or five months. In spite of the difficulties caused by the missing intermediate values, KUGLER reached the following results. He identified a column (denoted by E) representing the moon's latitude, established the main rules for its computation, and found by comparison with OPPOLZER's "Canon" that one column (called Ψ here) in the eclipse text was closely related to the magnitude of the eclipse.[2]

The investigation of System A was given a fresh impetus by the appearance of new textual material and particularly by the consistent application of the idea that Diophantine equations should be the tool to answer the question whether or not a given fragment of an ephemeris could be the result of continued computation starting from another ephemeris of the same system.[3] It could be shown by this method that all known fragments of System A were parts of the same undisturbed process of computation of all columns with the single exception of the column for the moon's latitude in a single text.[4] As to the column Ψ, it became clear that the relationship between the latitude E of the moon and the magnitude Ψ of an eclipse was given by

$$(1) \qquad \Psi = c + \text{sign } K \cdot \frac{E}{6}$$

where $c = 17,24,0$ is a certain constant and sign $K = +1$ for an ascending node but sign $K = -1$ for a descending node, and where E is the latitude of the moon at the moment of opposition. In addition, it was possible to determine for both systems the exact shape of the curve which led to the specific rules for the computation of column E in the ephemerides. This is to be understood as follows. Assume that we are given E as a *continuous* function of time (called the "true function"); we then obtain the ephemerides from it by tabulating the values of this function for the moments of the syzygies. The above statement is then equivalent to saying that it was possible to discover the true functions from which the ephemerides were derived. Their graph is given in Fig. 1, where the points N and $N+1$ indicate the moments of opposition in the months N and $N+1$, respectively; the values of E at these points are the values found in the ephemerides.

By the consideration of variable points on the surface of the moon, I made an attempt[5] to explain the peculiar shape of these curves and to deduce the value of the angular diameter of the moon and of the

* The first five articles of this series were published in the "Quellen und Studien zur Geschichte der Mathematik," Ser. B, Vol. 4 (1937–1938), under the title "Untersuchungen zur antiken Astronomie." The sixth study will be published in the anniversary volume dedicated to G. SARTON.

[1] KUGLER's Systems II and I respectively.

[2] KUGLER BMR p. 155.

[3] NEUGEBAUER UAA II.

[4] NEUGEBAUER UAA II p. 89.

[5] NEUGEBAUER UAA III.

shadow of the earth. PANNEKOEK recognized [6] that I had committed a trivial mistake in this discussion which made untenable my results concerning these diameters. PANNEKOEK returned to KUGLER's initial hypothesis [7] that the greater inclination of E in System A in the nodal zone is the result of an attempt to describe better the actual variation of the latitude of the center of the moon. This interpretation will be fully confirmed in the following discussion.

2. In order to describe the progress made beyond the state of affairs explained above, I must return to the exceptional text mentioned before. The text [8] in question contains, instead of a latitude function as described in Fig. 1a, a function of the same period but with unaltered slope in the nodal zone, which I had interpreted as the latitude of the moon's center and therefore called the "center-function" E' (dotted line in Fig. 2). The fact that all values were only one-third of the values corresponding to the dotted line in Fig. 2 could be understood, at least in principle, as a change of metrological units. More serious, however, appeared the fact that this new function had not the simple relation to the latitude function indicated by the dotted line in Fig. 2 and Fig. 3 but showed nodes in advance of the corresponding nodes of E (thick line in Fig. 3). At the time of my publication, it seemed possible to explain this in the following way. The text in question is the latest text (49 B.C.) of System A, whereas all the other texts belong to the period from 175 B.C. to 59 B.C.; one could assume that the uninterrupted use of E for more than 150 years eventually led to an accumulated error which was corrected between 59 and 49 B.C. This explanation, which was not very plausible in itself because of the great accuracy of the period of E, became untenable when, by means of the Diophantine method, I recently dated two fragments which contain the same function as the latest text but belong to the years 102 B.C. and 163 B.C. respectively.[9] All columns of these texts were connectible with all the remaining texts with the sole exception of the "center-function" E' which, in turn, led in unbroken continuation to the corresponding column of the latest text. This result seemed to confront us with the absurd situation that for more than 150 years two latitude functions existed side by side with exactly the same period but with different nodes. All the other columns, however, were computed exactly alike.

This riddle was completely solved when I recognized that the very same numerical value which occurred in the function E' in the ephemeris of 163 B.C. also occurred in the eclipse text, mentioned above, but in the column Ψ. In other words, the alleged center-function E' is nothing but the continuation of the eclipse magnitude Ψ. Consequently, all the texts of System A form, without exception, a uniform group of ephemerides computed with no modification whatsoever for more than 150 years, — with the sole restriction that some ephemerides contain merely the moon's latitude (E), others give E and Ψ, and still others Ψ alone.

Certain details must be presented in order to make these statements fully clear. First of all, it must be said that the "magnitude" of an eclipse, as defined by (1), p. 10, is measured in a way which is slightly different from the way it is done today. We would say that the greatest total lunar eclipse corresponds to latitude zero (central eclipse). The corresponding value of Ψ according to (1) would be $\Psi = c$ because $E = 0$. For eclipses smaller than the central eclipse, the modern definition and (1) would agree; that is to say, $\Psi \leqq 0$ indicates that no eclipse will take place and that the magnitude increases from $\Psi = 0$ to $\Psi = c$ with decreasing latitude. If the immersion of the moon increases beyond the central position, we would ascribe to the eclipse a value decreasing with increasing distance of the center of the moon from the ecliptic, whereas (1) indicates that Ψ further increases from c to $2c$. Fig. 4 will illustrate this situation; it is evident that it is only a difference of terminology which distinguishes (1) from the modern definition. For the comparison of Ψ with modern tables for eclipse magnitudes, it is convenient to modify Ψ according to the modern definition (dotted line in Fig. 4).

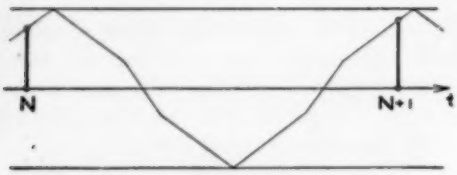
The second remark is much more essential. To this point we have tacitly assumed that Ψ is computed for only such oppositions where the latitude of the moon is so small as to make an eclipse, at least in principle, possible. In other words, Ψ has until now been defined only for every sixth, or perhaps fifth, full moon. Indeed, we have ephemerides in which E is computed for all syzygies, but Ψ only for those months when E is closest to zero. These values are then selected to build up an eclipse table. We said above, however, that Ψ was also computed for all *intermediate* oppositions where eclipses were obvi-

[6] PANNEKOEK [1] p. 12.

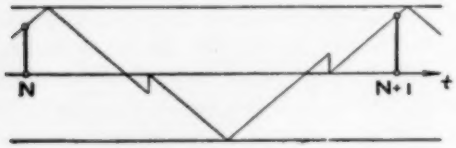
[7] KUGLER BMR p. 132, PANNEKOEK [1] p. 13.

[8] Incompletely published by SCHNABEL Ber. p. 244/5. The relevant part is transcribed in NEUGEBAUER UAA II p. 52 (cf. also UAA III p. 340).

[9] The first text, which is very badly preserved, was published by KUGLER BMR plate XI (Sp. II, 74 = B.M. 34600). Only traces of three numbers are visible in the critical column, to be restored as [1,24,4,4]8 [43,28,5]4 and [3,53,4]0. The second text (to be published in NEUGEBAUER ACT), however, is just well enough preserved to leave no doubts concerning the column in question.



a) System A



b) System B

Fig. 1

ously excluded. This statement is not fully correct without a minor modification in our definitions. We call Ψ' a function defined by

$$(2) \qquad \Psi' = \operatorname{sign} K \cdot c + \frac{E}{6}$$

for values of E sufficiently close to zero (in a sense which will be defined accurately in (3)). A comparison of (1) and (2) shows that Ψ and Ψ' are identical for ascending nodes but have opposite signs for descending nodes. This change of sign is necessary if Ψ should be extended to a *continuous* function with the same period as E. If (2) were used for all values of E, the function Ψ would have the same period as E as well as the same change in slope as E (Fig. 1) for values $|E| \geqq \kappa$. There is no reason, however, to introduce this complication into the computation of the values which are in any case of no significance outside the nodal zone. We obtain uniform slope for Ψ' if we define Ψ' as follows for all values of E:

$$(3) \qquad \begin{aligned} \Psi' &= \operatorname{sign} K \cdot c + \frac{E}{6} \quad \text{if} \quad |E| \leqq \kappa \\ \Psi' &= \operatorname{sign} K \cdot c + \frac{2E \mp \kappa}{6} \quad \text{if} \quad \begin{cases} E \geqq \kappa \\ E \leqq -\kappa \end{cases} \end{aligned}$$

where κ is the value of E where the slope of E changes to half of its value in the nodal zone.

It is this function which we find in the texts and which we denoted previously by E' (dotted line in Fig. 2). It is identical with Ψ for ascending nodes and with $-\Psi$ for descending nodes. The ephemerides contain either E and Ψ in separate columns, Ψ being computed only for every sixth or fifth month, or Ψ' alone, because E can always be obtained very easily from Ψ'.

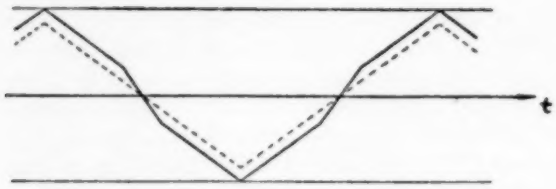


Fig. 2

3. Before turning to the discussion of System B, we must clarify the metrological units which are used in Systems A and B in connection with our problem. It is well known that angular distances were expressible either in degrees or in certain other units, the most important of which is the cubit (*ammatu*, abbreviated in the following by *a*). Unfortunately, the relation between cubits and degrees seems to be ambiguous, the cubit corresponding [10] either to $2\frac{1}{2}°$ or to $2°$. This ambiguity can be eliminated by introducing the smaller unit, "finger," denoted in the following by *f*. In the case of $1^a = 2°$, KUGLER found that $1^a = 24^f$; but in the case of $1^a = 2;30°$, it is $1^a = 30^f$. In both cases,

$$(4) \qquad 1^f = 0;5°$$

holds regardless of whether 24 or 30 fingers are called one cubit.

We must now determine the units employed to measure the latitude of the moon E and the magnitude of eclipses Ψ. The values of the characteristic parameters of E and Ψ' in System A are

for E: $M_E = 7,12,0,0$; $\kappa = 2,24,0,0$

for Ψ': $M_{\Psi'} = 2,0,0,0$; $c = 17,24,0$.

In my previous investigation of the latitude function, I found no other way to explain these numbers satisfactorily except to assume that they are measured in thirds of cubits. Unfortunately, such units are not attested in independent use elsewhere, but they at least gave reasonable values for the magnitudes in question. On the other hand, serious difficulties were encountered in extending this assumption to System B. The whole problem of the units employed took a new turn when I found the units of "finger" mentioned in connection with eclipse magnitudes in one of the so called "procedure texts," which give rules for the computation of the ephemerides.[11] It became increasingly clear that the assumption of thirds of cubits as units for E and Ψ was untenable. Indeed,

[10] KUGLER BMR p. 127, SSB I p. 25 and SSB II p. 547 ff.
[11] To be published in NEUGEBAUER ACT.

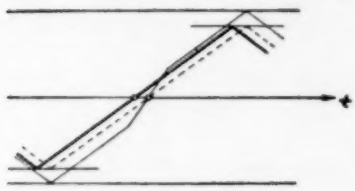


Fig. 3

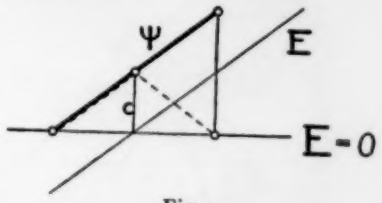


Fig. 4

all difficulties disappeared when I realized that the units in E are "barleycorn" (še), units well attested in Babylonian metrology. Ordinarily, the barleycorn (denoted in the following by ^{š}) is $\frac{1}{180}$ of the shekel (gín). There exists, however, a small text from Assur,[12] which shows that the barleycorn was also used to denote $\frac{1}{180}$ of the cubit. Using the cubit of $2\frac{1}{2}°$, we have with (4)

(5) $1^{š} = 0;0,20^{a} = 0;0,50° = 0;10^{'}$

and for E we obtain

$$M_E = 7,12^{'} = 6° \qquad \kappa = 2,24^{'} = 2°.$$

The value of 6° for the extremal latitude (affected, of course, by parallax) is also independently attested by an unpublished procedure text.

In order to find the units of Ψ', we need only notice that according to (5)

$$1^{'} = 6^{š}.$$

The factor $\frac{1}{6}$ in the formula (3) defining Ψ' by

$$\Psi' = \text{sign } K \cdot c + \frac{E}{6}$$

can therefore be interpreted as changing barleycorn into fingers. In other words, $\frac{E}{6} = E^{'}$ is the latitude of the moon expressed in fingers, and therefore c and Ψ' must also be measured in fingers, as is explicitly confirmed by the procedure text mentioned above and by observational texts.[13] We can thus write instead of (3)

(6a) $\Psi' = \text{sign } K \cdot c + E^{'}$ if $|E^{'}| \leqq \kappa^{'}$

(6b) $\Psi' = \text{sign } K \cdot c + 2E^{'} \mp \kappa^{'}$ if $\begin{cases} E^{'} \geqq \kappa^{'} \\ E^{'} \leqq -\kappa^{'} \end{cases}$

where

(6c) $c = 17;24^{'} = 1;27° \quad \kappa^{'} = 24^{'} = 2°.$

[12] Published by THUREAU-DANGIN [1] p. 33. Cf. also NEUGEBAUER UAA III p. 280.

[13] KUGLER SSB I p. 276 b s.v. SI.

These formulae have a very simple interpretation. Formula (6a) shows that for small latitudes (less than $\pm 2°$) the magnitude of an eclipse increases with decreasing latitude, whereas (6b) tells us that outside the nodal zone Ψ' has a slope twice that of the curve for E. But outside the nodal zone, the function E has only half the slope it had inside. Thus (6b) shows that Ψ' does not change its slope but continues with the slope of the inner strip. The reason is clear: it is important to describe the latitude of the moon by a function which represents closely enough the fact that the latitude changes more rapidly near the ecliptic than near the extrema. The eclipse magnitude Ψ', however, has physical significance only for small latitudes, and the way it is continued from node to node is therefore irrelevant if only its period is correct and if the relation (6a) is restored whenever eclipses are possible. The result is illustrated by Fig. 5.

I think one is correct in saying that this construction of the function Ψ' shows an amazing highly developed "modern" attitude toward the whole problem. For reasons of purely mathematical expediency, the initial definition (1) of the magnitude Ψ of an eclipse is modified by the construction of a continuous function Ψ' which has no astronomical significance whatsoever in general but gives the right numerical results whenever the conditions for an eclipse are satisfied. It is precisely this trend to a mathematical formulation of all methods which we find wherever we reach a complete understanding of the basic ideas of System A.

4. If we compare our above results with the material available for ephemerides of System B, it becomes immediately evident that the alleged columns for latitude of the type represented by Fig. 1b are actually columns for the magnitude of eclipses,[14] extended to a function Ψ'. The discontinuous jumps after each crossing of the zero line can be explained as follows. As in the case of System A, the "magnitude" Ψ of an eclipse ranges from 0 to $2c$, where the value c corresponds to the exactly central

[14] This confirms a conjecture, mentioned to me by VAN DER WAERDEN several years ago; at that time it seemed impossible to prove it, with the hopelessly entangled metrological situation and with no known parallel in System A.

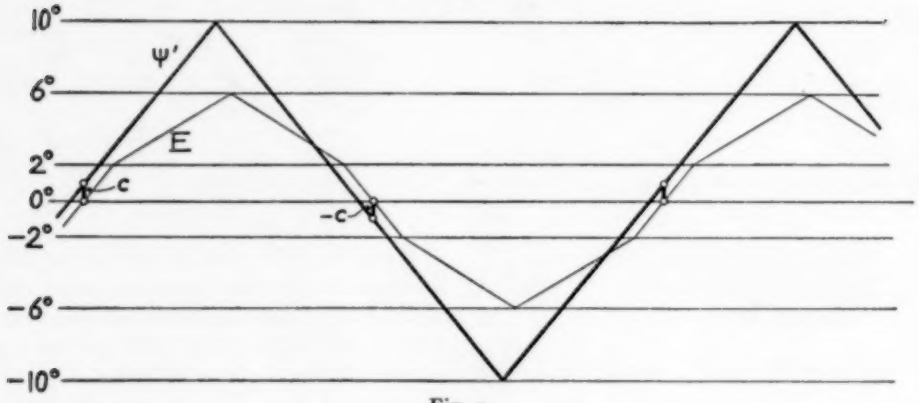


Fig. 5

eclipse (latitude $E = 0$). Outside of the interval $0 \leqq \Psi \leqq 2c$ no eclipses are possible and it is therefore irrelevant how we pass from one node to the next by means of a function Ψ'. Fig. 6 shows how Ψ' was chosen with respect to the nodes of E.

Three groups of units are known [15] to have been used in texts of System B for Ψ'. In the first group, we have

$$c = 18{,}0 \qquad M = 1{,}58{,}27$$

where M denotes the maximum of Ψ'. Comparison with System A shows immediately that the above quantities must be measured in fingers because in System A we have $c = 17;24^{\prime}$ and $M = 2{,}0^{\prime}$. We thus obtain for this first group from (4) p. 12

$$(7a) \qquad c = 18^{\prime} = 1;30^{\circ} \qquad M = 9;52{,}15^{\circ}$$

This result is directly confirmed by the next group of units which are given by

$$c = 1{,}30{,}0 \qquad M = 9{,}52{,}15$$

thus being identical with (7a). In the last group we have

$$c = 1{,}0{,}0 \qquad M = 6{,}34{,}50.$$

The values of c and M in this group are two-thirds of the corresponding values in the second group. Their significance becomes evident if we remember that $\Psi = c$ is the magnitude of the greatest total eclipse. If we call this value 1^{c}, then all other eclipses are measured in units of the greatest possible eclipse. Thus we have

$$(7b) \qquad c = 1^{c} \qquad M = 6;34{,}50^{c}.$$

These results are very satisfactory from the point of view of metrology. The only units which occur in the lunar ephemerides for the measurement of latitude and eclipse magnitude are the following: barleycorns, fingers, and degrees. In the column Ψ, indicating eclipse magnitudes, a measurement in units of the maximal eclipse is added in some texts of System B, but this is actually not a new metrological unit but merely a convenient expression of eclipse magnitudes. *Complete metrological uniformity is thus established for all lunar ephemerides.*

5. The discovery that the function which we once considered as the latitude of the moon really represents the eclipse magnitude has many implications, the detailed development of which must be postponed for later studies. Only a few points must be mentioned.

It is evident that we must assume that the latitude function E of System B must have a shape of the type indicated in Fig. 6, analogous to the shape of E in System A (Fig. 5). The question arises at what value κ the slope of E has to be changed and by what amount. Assuming that κ is again 2° and the slope for $|E| > \kappa$ half of the slope for $|E| < \kappa$ as in System A, we obtain for the extremal latitude of the moon $6;1{,}7{,}30^{\circ}$ instead of 6° in System A. This speaks in favor of our assumption but can only be proved by new texts.

The fact that we have texts of System B which contain two functions of type Ψ' side by side, essentially proportional but with quite different nodes, remains unexplained.[16] This difficulty is not due to our new interpretation, because it was equally unintelligible why two latitude columns were given side by side.

Another unsolved problem is the question of the angular diameter of the moon. It is, of course, very tempting to compare the eclipse magnitudes given by Ψ in "fingers" with magnitudes measured in "digits." This is further supported by the fact that $c = 17;24^{\prime}$ (System A) and $c = 18^{\prime}$ (System B) would be a fair approximation of the actual value of

[15] Cf. the list given in NEUGEBAUER UAA III p. 271.

[16] Cf. NEUGEBAUER UAA III p. 310.

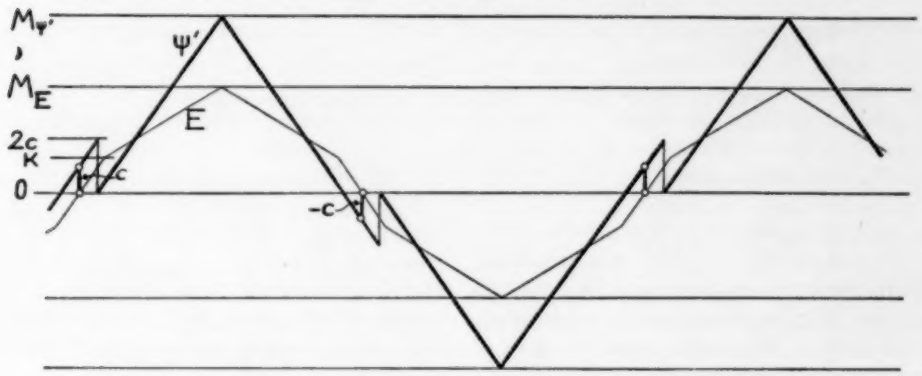


Fig. 6

about 22 digits for the largest lunar eclipse. This correspondence would imply that the lunar diameter was assumed to be $d = 12'$ or, because of (4), $d = 1°$ which is almost exactly twice the real value. Additional difficulties occur if one tries to determine the radius of the shadow cone. It seems to me that no decision can be made at present because of the interference of the lunar parallax which must have distorted the ancient measurements in a still unknown fashion. Only new texts or a better understanding of the terminology of the procedure texts will bring the solution of this question.

Finally, it must be mentioned that the clear separation of latitude and eclipse magnitude requires a reinvestigation of all previous attempts to use alleged latitudes for the comparison of results of Babylonian ephemerides of different systems with each other and with modern computations.

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HISTORY OF SCIENCE IN SWEDEN

By STEN LINDROTH

THIS essay will give a concise survey of the more important works in the history of science published during the last few years in Sweden. For natural reasons they are largely concerned with Swedish conditions, but even so they often seem to be of a more general interest, either because they deal with scholars whose works have achieved international renown, or because the Swedish material has been given a wider setting in the history of ideas.

At present, classical research is being zealously pursued in Sweden, and several works dealing with problems of the history of science have appeared in this field. With his study entitled *Griechische Pflanzennamen* (Göteborg 1940), REINHOLD STRÖMBERG has continued his researches into Greek botany. This time he investigates how the plant names found in THEOPHRASTUS, HIPPOCRATES, DIOSCORIDES etc. are formed, and what grounds lie behind the choice of designation. INGEMAR DÜRING's *Herodicus the Cratetean* (Stockholm 1941) brings to the fore a previously little known anti-Platonist and philologist of the Alexandrine Age, and sets him against a wider background of the history of ideas. The same author has also made a thorough study of *Aristotle's De partibus animalium* (Göteborg 1943), in which the interrelation and structure of the four Aristotelian books are discussed in detail, as also the textual tradition; in a commentary DÜRING has contributed towards establishing a new text of this work. Quite recently the same author has published yet another study on ARISTOTLE, *Aristotle's chemical treatise: Meteorologica, Book IV* (Göteborg 1944). This work contains a free translation of the fourth book of the *Meteorologica*, regarded by the author as unquestionably authentic, and also a full commentary of it and an introduction, in which one of the subjects discussed is the Aristotelian theory of matter, or 'chemistry.' GUDMUND BJÖRK, the distinguished connoisseur of the veterinary medicine of Antiquity, has pursued his investigations in this sphere with a study entitled *Apsyrtus, Julius Africanus et l'hippiatrique grecque* (Upsala 1944); here he devotes particular attention to the complicated literary problem which is linked up with the name SEXTUS JULIUS AFRICANUS, and investigates the fate of the hippiatric texts up to the present time. Considerable interest attaches to NILS ALMBERG's extensive work, *Platons världsjäl och Aristoteles' gudsbegrepp* (*Plato's world soul and Aristotle's conception of God*) (Lund 1941). The author has undertaken to clarify, by means of an extremely detailed discussion of the text, the connection between the Platonic philosophy as outlined primarily in *Timaios*, and the Aristotelian theory of the first unmoved Mover who is God. His thesis is that this latter has its historical background in the Platonic theory of the world soul. This penetrating analysis of the important philosophical questions involved here has undoubtedly enriched our knowledge of the two thinkers, and has in particular, with more consistency than earlier research, brought out the elements which their metaphysical principles have in common. In his study *Iatros och medicus* (*Iatros and medicus*) (*Lychnos* 1940) AXEL W. PERSSON contributes some facts about the history of the physician during Antiquity, and MARTIN P:N NILSSON has, in the same publication (year 1943), summarized his far-reaching researches into the astrology of Antiquity, *Astrologien i Antiken* (*Astrology in Antiquity*).

GUNNAR ASPELIN's study on *Ralph Cudworth's interpretation of Greek philosophy* (Göteborg 1943) takes us to the Platonic thought of the 17th century. This paper examines the development by the English philosopher of the *philosophia perennis* motive — the theory of the only true, primordial philosophy which was professed by Greeks and barbarians when the world was young. An interesting problem in the history of ideas has been taken up for treatment by WILHELM SJÖSTRAND in *Pedagogik och temperamentslära. En pedagogisk-psykologisk historik fram till mitten av 1700-talet* (*Pedagogics and theory of temperaments. A pedagogico-psychological survey up to the middle of the 18th century*) (Göteborg 1943). The well-known and now deceased biological historian, ERIK NORDENSKIÖLD, has treated the historical development of the biological conception of species from early times in a posthumously published essay (*Lychnos* 1940). With his usual perspicacity, ERNST CASSIRER, for some years attached to the University of Göteborg, analyzes in *Mathematische Mystik und mathematische Naturwissenschaft* (*Lychnos* 1940) important questions bearing on the history of the genesis of the exact sciences. During the time he was working in Sweden,

CASSIRER also pursued a penetrating study of DESCARTES, which he has embodied in a large monograph, *Descartes* (Stockholm 1939), and in a study published in Swedish, and in part identical with the monograph, entitled *Drottning Christina och Descartes* (*Queen Christina and Descartes*) (Stockholm 1940). In this latter the author seeks to answer the question as to how far DESCARTES, who as we know gave instruction to the Queen in 1649–50, was instrumental in converting her to the Catholic faith. The task is a delicate one and the sources meagre; in a full critique in *Lychnos* 1940, JOHAN NORDSTRÖM shows CASSIRER to have taken the solving of the problem far too lightly. NORDSTRÖM has also written a short essay, *Några notiser om drottning Kristinas akademier* (*Some notes on Queen Christina's academies*) (*Lychnos* 1940), in which he presents the subsequently forgotten statutes which DESCARTES drew up for the small and short-lived academy which Christina founded at the beginning of 1650; it was the first Swedish academy of any kind. In *Lychnos* 1940 N. V. E. NORDENMARK accounts for the acquisition by the Swedish Academy of Science of the large Bernoulli collection of letters, comprising 1,576 letters to and from JEAN (I) BERNOULLI. ASTA EKENVALL surveys the early history of the learned periodical in *Om de första lärda tidskrifterna* (*On the first learned periodicals*) (*Lychnos* 1941); new material has enabled her to give special attention to *Journal des savants*, and to throw clearer light on its first years.

The history of astronomy in Sweden has recently received considerable attention. NORDENMARK, indefatigable even in his old age, has given us *Pehr Wilhelm Wargentin* (Upsala 1939), a large and plentifully documented study. WARGENTIN was the most outstanding Swedish astronomer of the 18th century, widely renowned for his treatise on the moons of Jupiter; other sides of the work of this versatile man are also brought out in this study, however, including his great merits as secretary in the Swedish Academy of Sciences, and his pioneer work in population statistics. In his youth WARGENTIN was a pupil of the astronomer HIORTER, treated by NORDENMARK in his essay *Olof Hiorter. Observator regius* (Stockholm 1942), where prime interest attaches to the account of HIORTER's share in the discovery of the connection between the false indication of the magnetic needle and the Aurora borealis. Another Swedish astronomer of the 18th century, MÅRTEN STRÖMER, — successor of the illustrious ANDERS CELSIUS as professor at Upsala — is dealt with by the same author in the paper *Mårten Strömer* (Stockholm 1944). Important but hitherto little known questions in the history of Swedish astronomy have been constructively discussed by HENRIK SANDBLAD in several essays in *Lychnos* 1942 *et seq.*: *Galilei i Sveriges lärda litteratur till Magnus Celsius* (*Galilei in the learned literature of Sweden to Magnus Celsius*) and *Det copernikanska världssystemet i Sverige* (*The Copernican world system in Sweden*). The results reached in these studies may well be considered definitive; the strength of the second paper lies primarily in the consistency with which the main question of astronomy is fitted into a general philosophical context — that is to say, the battle round the new system is regarded as a special aspect of the conflict between Aristotelianism and Cartesianism in Sweden. SANDBLAD takes a completely different starting point when, in his inaugural thesis *De eskatologiska föreställningarna i Sverige under reformation och motreformation* (*The eschatological ideas in Sweden during the Reformation and Counter Reformation*) (Upsala 1942), he approaches *inter alia* certain astronomical and astrological problems. His main task in this thesis is actually of the nature of history of religion. He has most absorbingly described the Christian eschatology, the ideas of the end of the world and Antichrist, during the 16th century in Sweden. But the heavenly phenomena played an important part in this literature, so that SANDBLAD's thesis treats in detail of all manner of pronouncements on celestial conjunctions, comets auguring ill, and other omens; they were all thought to have their definite prophetic significance.

A highly interesting problem of optics has been dealt with in extreme detail by NORDENMARK and NORDSTRÖM in an extensive investigation entitled *Om uppfinningen av den akromatiska och aplanatiska linsen* (*On the invention of the achromatic and aplanatic lens*) (*Lychnos* 1938 and 1939). With the help of a number of hitherto disregarded documents, including some from the archives of the Royal Society, the authors have been able to give an exhaustive presentation, rich in new viewpoints, of the history of how the achromatic lens was discovered. The main result emerging from this investigation is the part played in this discovery by the Swedish physicist SAMUEL KLINGENSTIERNA; it is shown that JOHN DOLLOND, the celebrated constructor of the achromatic telescope, was brought by an essay from KLINGENSTIERNA's pen, sent him in 1755, to believe it possible to do away with chromatic aberration. C. W. OSEEN, himself famous for his works in hydrodynamics, has made an extensive study of one of the greatest figures in Swedish physics in the paper *Johan Carl Wilcke. Experimentalfysiker* (*Johan Carl Wilcke. Experimental physicist*) (Upsala

1939). WILCKE (d. 1796) was a many-sided investigator. His most important work had to do with the theory of electricity and the theory of heat: his papers on latent and specific heat are classical. OSEEN's monograph also includes the discussion carried on abroad of the problems occupying WILCKE. OSEEN has also produced an edition of CARL WILHELM SCHEELE's manuscripts, most of them hitherto unprinted, entitled *Carl Wilhelm Scheele, Manuskript 1756–1777*, and, with a companion facsimile volume, reproducing the whole of the published text. This work was undertaken at the instance of the Swedish Academy of Sciences, in celebration of the bicentenary of SCHEELE's birth. A complete edition of the MSS of the great chemist is most certainly a very desirable thing, but the task of producing it is exacting, and the editor has unfortunately not shown himself equal to it. His work as an editor has been submitted to sharp but justifiable criticism by JOHAN NORDSTRÖM in *Lychnos* 1942. In the same publication NORDSTRÖM has made an important contribution to SCHEELE research by tracing and collocating *Några bortglömda brev och tidskriftsbidrag av Carl Wilhelm Scheele* (*Some forgotten letters and magazine articles by Carl Wilhelm Scheele*) (1942). It might also be mentioned that a collection of hitherto unknown letters to and from another of the great figures in Swedish chemistry, BERZELIUS, has recently been published: *Jac. Berzelius brev* (*Jac. Berzelius's letters*), Suppl. 2, edited by A. HOLMBERG (Upsala 1942). OTTO JOHANNSEN goes back to an earlier period in *Peder Månssons Bedeutung für die Geschichte der Technik* (*Lychnos* 1941). The Swedish monk PEDER MÅNSSON, who died in 1534, left behind him a number of writings on technical subjects; they dealt with foundries and foundry-production, glass-making, etc., and are often very valuable as sources; this is illustrated in more detail in JOHANNSEN's survey.

The central figure in the history of biology in Sweden is, of course, LINNAEUS, and still further aspects of the man and his work have been opened up recently. After a break of more than twenty-five years, a new volume has appeared in the large-scale edition *Bref och skrifvelser af och till Carl von Linné* (*Letters and writings by and to Carl von Linné*); this volume (Section II:2, completed under the direction of the distinguished Linnean expert ARVID UGGLA, Upsala 1943) contains *inter alia* the copious correspondence between LINNAEUS and the Dutch botanists BURMANN, father and son. It is devoutly to be wished that this work, of importance not only to Swedish history of science, be energetically resumed and brought to completion. KNUT HAGBERG has published a biography intended for the non-specialist, *Carl Linnaeus* (Stockholm 1939). It is brilliantly written, and affords several new viewpoints on the subject, but it does not go very deeply into LINNAEUS's scientific achievement. Valuable contributions to the knowledge of LINNAEUS and the Linnean tradition have, now as earlier, been presented in the yearbook of the Swedish Linnean Society. We confine ourselves here to mentioning an extensive study by RUTGER SERNANDER on *Johan Abraham Gyllenhaal. En förbisedd Linnélärjunge* (*Johan Abraham Gyllenhaal. A disregarded Linnean disciple*) (year 1943). — STEN LINDROTH, *Uralstringen. Ett kapitel ur biologiens äldre historia* (*Spontaneous generation. A chapter from the early history of biology*) (*Lychnos* 1939) surveys, with special reference to the situation in Sweden, the animated debate during the 16th and 17th centuries on spontaneous generation.

Research into the history of Swedish medicine has been furthered by VILHELM DJURBERG's posthumous biography of *Läkaren Johan von Hoorn, förlossningskonstens grundläggare i Sverige* (*The physician Johan von Hoorn, the founder of obstetrics in Sweden*) (Upsala 1942). This remarkable physician, who lived 1662–1724, did an enormous amount to improve obstetrics, hitherto grossly neglected in Sweden, and at least one of his numerous works on this subject won great renown abroad. VON HOORN, whose life and theories are investigated with extreme pains in this biography, held very independent and sometimes advanced opinions on a number of questions. A problem in the history of medicine, over which much ink has been spilt, has been treated afresh and, in part, from new angles in an essay by NILS VON HOFSTEN, *Upptäckten av bröstgången och lymfkärlsystemet* (*The discovery of the thoracic duct and the lymphatic system*) (*Lychnos* 1939); this study is of great value for a clearer understanding of the embittered struggle for priority between OLAUS RUDBECK and THOMAS BARTHOLIN. STEN LINDROTH's detailed *Paracelsismen i Sverige till 1600-talets mitt* (*Paracelsianism in Sweden to the middle of the 17th century*) (Upsala 1943) is also devoted in large measure to medical problems; it studies the Paracelsian current as revealed on Swedish soil. As is known, the intentions of PARACELSUS and his successors were wide, and different spheres of Swedish scientific life are dealt with: natural philosophy, alchemy, the mystic trend, and its foremost name, JOHANNES BUREUS, pansophy and medicine, particularly the development of chemical pharmacology. In some essays in *Lychnos* the same author has touched on certain problems

bound up with Paracelsianism: in *Till frågan om Basilius Valentinus* (*On the question of Basilius Valentinus*) (*Lychnos* 1940) he seeks to demonstrate that the Leipzig professor, JOACHIM TANCKIUS, had a share in the publication of the famous chemical writings which went under the name of BASILIUS VALENTINUS. In a study on *Pharmacopoeia Holmiensis 1686* (*Lychnos* 1943) LINDROTH examines the first Swedish pharmacopoeia and its position in the history of medicine; he also surveys the general history of pharmacopoeia since Antiquity. O. T. HULT, the Grand Old Man of Swedish medical history, has, in *Lychnos* 1940, described *Frankrike i svensk medicin under 16- och 1700-talen* (*France in Swedish medicine during the 17th and 18th centuries*); this paper deals with the studies of the Swedish physicians in France and the medical activity of the French in Sweden.

An extremely comprehensive work, giving a panorama of an illustrious epoch in Swedish scientific research, is BENGT HILDEBRAND's *Kungl. Svenska Vetenskapsakademien. Förhistoria, grundläggning och första organisation* (*The Royal Swedish Academy of Sciences. Early history, founding and first organisation*) (Upsala 1939), published to celebrate the two hundredth jubilee of this Academy. The presentation is very broad; the Academy founded in the year 1739 is placed in a carefully delineated milieu of the period; its founders and first members — among whom we find such men as LINNAEUS, KLINGENSTIERNA, CELSIUS — are portrayed with extreme skill. Even if it does not, perhaps, tell us as much as we should like to know of the purely scientific activity within the Academy, HILDEBRAND's great work will nevertheless be of inestimable future help to studies of the flourishing scientific research of the 18th century in Sweden; few learned bodies have been made the subject of so thorough and at the same time so enjoyable a survey, even though in this case it only covers the first years. A detailed study is made of the forerunner to the Swedish Academy of Sciences, i.e. Collegium curiosorum, by AXEL LILJENCRANTZ in *Christopher Polhem och grundandet av Sveriges första naturvetenskapliga samfund* (*Christopher Polhem and the founding of Sweden's first scientific society*) (*Lychnos* 1939 and 1940). The author shows that POLHEM — a many-sided genius, but primarily concerned with mechanics — was the mainspring in the foundation of this Collegium, which took place in Upsala at the turn of the year 1710/11. Finally, ARVID UGGLA has used studies in the archives of the Royal Society in London on which to base a valuable compilation of *De tidigaste förbindelserna mellan Royal Society och Sverige* (*The earliest connections between the Royal Society and Sweden*) (*Lychnos* 1940); here he reproduces and comments on several of the letters exchanged between the Swedish scholars and the illustrious English body.

It is already clear from the above short account of the research into the Swedish history of science that this latter has its natural centre in *Lychnos*, the Annual of the Swedish History of Science Society. *Lychnos* has now appeared in eight volumes, directed by Professor JOHAN NORDSTRÖM. It should be pointed out that all essays printed there in the Swedish language are provided with summaries in English, French, or German. Further studies and investigations in the last volumes of *Lychnos* are, perhaps, worthy of mention here, but it may be that such a procedure is superfluous; it surely cannot be long before the times again permit an open exchange of ideas and books between scholars and countries now cut off from one another.

Upsala

NOTE SUR LA POSSIBILITÉ DES RÉPÉTITIONS COSMOLOGIQUES

JACQUES DELEVSKY

ON connaît la célèbre controverse qui partageait, dès l'antiquité et jusqu'à nos jours, le monde scientifique, au sujet de la répétition ou de l'irrépétition de l'histoire de l'univers. Retour éternel? Mouvement irréversible asymptotique, dirigé toujours dans le même sens, conformément au 2e principe de la thermodynamique? Ou une infinité de variations qui ne s'encadrent pas dans ces deux schémas opposés? Voilà un problème qui touche à la fois, à la science exacte, à la philosophie des sciences et à l'histoire des sciences.

Ce problème se réduisant, sous sa forme la plus simplifiée, à l'étude du nombre possible de la totalité des combinaisons différentes dans l'histoire du monde, peut-il être traité mathématiquement? Ainsi que nous l'avons constaté dans un travail publié en 1933

(J. DELEVSKY, Cosmogonie et philosophie de l'histoire, *Revue Philosophique*, Septembre–Octobre 1933), il n'a encore été étudié, à notre connaissance, par aucun mathématicien. Nous présentons ici un résumé de certaines conclusions auxquelles l'étude mathématique du problème nous amène, à titre d'essai.

Voici en quoi consiste le principe du calcul. On imagine un monde tridimensionnel, limité ou infini. La "matière" contenue dans ce monde, se présente, en dernier compte, comme un agrégat de particules élémentaires, ou "points-particules." Pour fixer les idées, on admet que chaque point-particule doit être situé dans un élément d'espace, ou "cellule" élémentaire. Le nombre des positions possibles pour un point-particule contenu dans une cellule quelconque de l'espace s'exprime par le quotient du volume, fini ou infini, de l'espace sur le volume de la cellule élémentaire. Chaque arrangement spatial de l'ensemble des particules doit durer une certaine quantité de temps, laquelle, dans l'histoire du monde, peut être finie ou infinitésimale. Il s'agit de déterminer alors la *durée totale* de tous les arrangements spatiaux possibles. Si cette durée totale est *finie*, l'histoire du monde doit se répéter nécessairement, après l'épuisement de toutes les combinaisons possibles, et il y aura alors nécessairement des Retours éternels. Si, par contre, la durée totale de tous les arrangements spatiaux possibles est *infinie*, les variations cosmologiques peuvent se succéder dans l'histoire du monde, sans nécessité de s'épuiser et de se répéter; le cycle répétitionnel éternel ne s'impose pas alors nécessairement, et l'histoire du monde pourra changer infiniment, sans se répéter.

En ce qui concerne l'espace et le temps, diverses modalités peuvent être envisagées: espace continu et divisible à l'infini; espace discontinu, atomique, avec un nombre fini de cellules (ou "ultimes particules") dans chaque volume fini; espace discontinu, atomique, mais divisible à l'infini (sans "ultimes particules"); temps continu, divisible à l'infini; temps discontinu, atomique, avec ou sans "ultimes particules."

° ° °

Admettons, d'abord, l'hypothèse d'un *monde fini*.

On déduit alors facilement que, si, dans un volume limité de l'espace, supposé isotrope et composé de m cellules, sont contenus N points-particules, le nombre de tous les arrangements spatiaux possibles, pour un m très grand par rapport à N, s'exprime par la quantité $(\frac{m}{e})^{N}$, où e est la base des logarithmes népériens.

On démontre ensuite que, pour m croissant infiniment, la durée totale T de tous les arrangements spatio-temporels possibles s'exprime par la formule

$$T = \sqrt{2\pi} \cdot m^{N} \cdot \left(\frac{n}{e}\right)^{n} \cdot n^{\frac{1}{2}} \cdot t,$$

où t est la moyenne arithmétique des différentes durées de tous les arrangements spatio-temporels possibles, et n est le nombre des valeurs différentes que peut prendre la durée du temps de chaque arrangement entre le maximum et le minimum des durées.

Cette formule est susceptible d'admettre les interprétations suivantes:

1° *Espace et temps continus, divisibles à l'infini.* La durée T aura alors une valeur *infinie*, si la valeur de t est *finie*. Dans ce cas, les répétitions et les Retours éternels pourront ne pas s'imposer. Dans cette modalité, le monde limité pourra évoluer selon une histoire qui ne se répéterait complètement jamais, et qui présenterait constamment de nouveaux aspects.

Mais si t est une quantité *infinitésimale*, T pourra avoir une valeur *finie* (bien que les valeurs de m, n soient infinies). Les répétitions cosmologiques et les Retours éternels seront alors possibles.

2° *Espace et temps discontinus, atomiques, non divisibles à l'infini*, donc avec "ultimes particules" insécables. Avec les valeurs finies de m, n, t, N on aura la valeur de T *finie*. Il y aura donc occurrence des répétitions, des cycles périodiques, des Retours éternels.

3° *Temps discontinu, atomique, mais divisible à l'infini* (sans "ultimes particules"). Dans ce cas, n sera un infini *dénombrable*. On trouve alors une valeur *infinie* pour T, et cela même pour m et t finis. L'histoire du monde sera alors possiblement irrépétible.

Si, toutefois, on admet l'existence d'une structure spatio-temporelle spéciale, le problème est susceptible de trouver une autre solution. Admettons, par exemple, que, c étant un nombre fini, et α le nombre cardinal de l'ensemble infini des nombres entiers, la valeur de t s'exprime sous la forme $t = c\alpha^{-(n+N+\frac{1}{2})}$. On trouvera alors pour T une valeur finie. Il y aura dans ce cas alors possibilité de cycles périodiques infinis, de Retours éternels. Un tel résultat ne pourrait, cependant, être obtenu qu'à la suite de certains raisonnements assez artificiels et de l'adoption d'images peu intuitives de la structure de l'espace et du temps.

Passons maintenant au cas d'un *monde tridimensionnel infini:* ou un monde matériel infini compris dans un espace infini, ou bien un Univers matériel fini dans un espace infini vide (ARISTOTE). Dans le

premier cas le nombre N des particules sera infini, dans le deuxième cas il sera fini. Admettons la structure discontinue de l'espace dans le premier cas; le nombre des cellules de l'espace m sera alors un infini dénombrable. Admettons encore que $N = m$. On trouvera alors pour T la valeur suivante:

$$T = 2\pi \left(\frac{m}{e}\right)^m \left(\frac{n}{e}\right)^n (m\,n)^{\frac{1}{2}} \cdot t$$

La valeur de T sera alors infinie, que t soit fini ou infini (mais non infinitésimal), et quelle que soit la structure du temps. Selon cette modalité, le monde infini, dans son ensemble intégral, pourra évoluer dans un changement perpétuel irrépétible, sans cycle périodique infini, sans Retour éternel.

Toutefois, ici encore, dans certaines suppositions, la valeur de t peut devenir *tellement petite dans l'ordre infinitésimal* que le produit exprimant la valeur de T donne un résultat fini. Il faut pour cela adopter une structure spatio-temporelle du monde très speciale et admettre que t s'exprime par des nombres infinitésimaux d'ordre de petitesses insaisissablement évanouissantes. Dans ce cas l'histoire du monde infinie, toujours renouvelée, aura l'aspect d'un cycle répétitionnel permanent, d'un Retour éternel. Telles suppositions doivent nous frapper par l'encombrement de certaines adaptations peu intuitives, difficiles à saisir et à concevoir.

° ° °

Dans ces spéculations nous nous sommes bornés à étudier des *possibilités* spatio-temporelles, en n'examinant celles-ci qu'au point de vue *mathématico-combinatoire*, en posant tout d'abord le problème quasi-géométrique qui consiste à analyser le nombre des arrangements ou combinaisons possibles. Or, l'histoire réelle des mondes et des systèmes dépend des causes *physiques*, dont l'effet, obéissant à un *déterminisme causal* concret, peut limiter radicalement les possibilités géométriques.

D'autre part, si la physique est éliminatoire en ce sens qu'elle interdit certaines combinaisons qui se présentent comme possibles du point de vue géométrique, mais impossibles ou irréalisables du point de vue physique, elle étend, par contre, le domaine des possibilités en dehors des combinaisons envisagées dans les prémisses mathématiques, posées, par exemple, au point de vue de l'identité des particules, qui, effectivement, pourraient posséder des propriétés de dissemblance, virtuellement variable dans le temps.

Les conclusions hypothétiques ne fourniraient que des suggestions susceptibles de nous guider quelque peu dans l'obscurité qui enveloppe l'essence de l'Infini.

Dans l'histoire de la science et de la philosophie s'entrechoquaient certaines idées quasi-monistes. HÉRACLITE et ECCLÉSIASTE se plaçaient sur les deux pôles opposés. L'astronomie, la cosmogonie contribuaient à la création des schémas de la "Grande Année," de la mort et de la renaissance des astres, du Retour éternel, et des conceptions d'un cycle périodique infini, telles que l'ont imaginé AUGUSTE BLANQUI, NIETZSCHE, ABEL REY, certains philosophes et même historiens. Des physiciens appliquaient à l'histoire du monde le principe de CARNOT-CLAUSIUS et, partant de ce principe, réclamaient le droit d'enchaîner l'histoire de l'Univers, dans une formule de marche fatale irrépétible, irréversible, vers une sorte de mort. Des deux côtés on était amené à des paradoxes terriblement insolubles. Il y avait, d'autre part, — et il y a encore aujourd'hui — une lutte contre l'Infini, et l'Infini se vengeait en exhibant des antinomies irrésolubles. On n'a pas encore trouvé la solution idéale du problème. Est-il permis de conclure à l'impuissance de la prétention de trouver une solution dans des schémas grossièrement monistes et par trop simplistes?

SIXTY-EIGHTH CRITICAL BIBLIOGRAPHY

OF THE

HISTORY AND PHILOSOPHY OF SCIENCE AND OF THE HISTORY OF CIVILIZATION (TO JANUARY 1945)

THE latest Critical Bibliography to appear was the sixty-seventh which was published in *Isis*, 35, 349–62, 1945, but two bibliographies, nos. 58 and 59, are thus far unavailable to the majority of our readers because of the German invasion of Belgium. The bibliography no. 58 has actually been published in *Isis* (vol. 31, 491–608, April 1940), but only nine copies of the issue containing it (no. 84 of *Isis* completing vol. 31) have reached America.

This sixty-eighth bibliography contains about 630 items. They have been kindly contributed by the seven following scholars:

C. W. ADAMS (London)
I. B. COHEN (Cambridge, Mass.)
M. GRAUBARD (Washington, D. C.)
C. D. LEAKE (Galveston, Texas)
M. F. A. MONTAGU (Philadelphia, Pa.)
G. SARTON (Cambridge, Mass.)
C. ZIRKLE (Philadelphia, Pa.)

The sections dealing with the Middle Ages and Byzantium (sections 6–7) are especially full, as I have liquidated as much as I could of my stock of notes concerning them. I have in my drawers a large number of notes which will be published as soon as it has been possible to check them upon the originals or otherwise.

For the sake of new *Isis* readers, it is worth while to explain briefly the method of this bibliography. The fundamental classification is chronological by centuries, and from the fourth century B.C. on by half centuries. Thus, items concerning ARCHIMEDES or HARVEY are classified in the sections devoted, respectively, to the second half of the third century B.C. or to the first half of the seventeenth century. Items which cannot be classified in that way are then listed, if possible, under one of the historical or ethnographical headings of Part II, which is subdivided as follows:

I. *Antiquity:* 1. Antiquity (generalities); 2. Egypt; 3. Babylonia and Assyria; 4. Greece; 5. Rome.

II. *Middle Ages:* 6. Middle Ages (generalities); 7. Byzantium.

III. *Oriental Science and Civilization:* 8. Asia (generalities), Western Asia (including "The ancient East" in general), Central Asia, Eastern Asia (including works relative to the whole of Buddhist Asia, or to India, Central and Eastern Asia combined); 9. India; 10. China; 11. Japan; 12. Israel (including works devoted to Palestine); 13. Iran; 14. Islam (also Arabia).

IV. *New World and Africa:* (a) America; (b) Oceania; (c) Africa (outside Egypt and Islam).

Thus, books or articles relating to Greek geometry or Chinese medicine are classified, respectively, under 4. Greece or 10. China.

Finally, items irreducible to the classifications of Parts I and II are classified in Part III according to the branch of science to which they belong. Part III is subdivided as follows:

I. *Science in general:* 15. Bibliography of Science; 16. History of Science; 17. Organization of Science (internal organization is meant, see *Isis*, 1, 195; for external organization, national or international, see section 55); 18. Philosophy of Science.

II. *Formal Sciences* (*knowledge of forms*): 19. Logic and Theory of Knowledge; 20. Mathematics; 21. Statistics (History and methods. Tables and generalities. For the applications, refer to the sciences to which they are applied.).

III. *Physical Sciences* (*knowledge of inorganic nature*): 22. Mechanics (including celestial and atomical mechanics); 23. Astronomy; 24. Physics; 25. Chemistry, Physical Chemistry, Industrial Chemistry; 26. Technology (For Mining, see 32. Geology; for Industrial chemistry, 25. Chemistry. See also Arts and Crafts under 45.).

IV. *Biological Sciences* (*knowledge of organic nature*): 27. Biology (generalities, "Natural history"); 28. Botany (Agronomy, Phytopathology, Palaeobotany); 29. Zoology.

V. *Sciences of the Earth* (*implying knowledge of both organic and inorganic nature*): 30. Geodesy; 31. Geography and Oceanography; 32. Geology, Mineralogy, Palaeontology, Mining. (For Palaeobotany, Palaeozoology, and Palaeoanthropology, see, respectively, 28. Botany, 29. Zoology, and 39. Prehistory.); 33 Meteorology, Climatology, Terrestrial Physics.

VI. *Anthropological and Historical Sciences* (*knowledge of man, past and present*): 34. Anatomy; 35. Physical Anthropology (Anthropometry and Races of Man); 36. Physiology (human and comparative); 37. Psychology (human and comparative); 38. Archaeology (generalities, methods), History of archaeology and erudition; 39. Prehistory; 40. Ethnology (primitive and popular science); 41. Superstition and Occultism; 42. Economics (Economic doctrines and history. Commerce. Transportation and communications); 43. Sociology, Jurisprudence, and Positive Polity; 44. History of Civilization (General history, Historical methods, Biography, Chronology); 45. History of Art (Art

and Science, Iconography, Arts and Crafts); 46. History of Language, Writing and Literature; 47. History of Morals (Moral organization of Society); 48. History of Philosophy (See also above 18. Philosophy of Science); 49. History of Religion (Science and Religion).

VII. *Medicine:* 50. History, organization, and philosophy of medicine; 51. Epidemiology. History of special diseases. Medical geography. Public health. Balneology. Social Medicine; 52. History of hospitals, of medical teaching, and of the medical profession; 53. Pharmacy. Pharmacology. Toxicology.

VIII. *Education (methods of accumulating, imparting, and diffusing knowledge)*: 54. Education (generalities, methods, colleges, universities); 55. Academies, societies, congresses. National and international organization of science (Societies and congresses devoted to particular sciences are classified under those sciences. For the internal organization of science, see section 17); 56. Bibliography (methods, libraries); 57. Museology (museums and collections).

58. Catalogues of second-hand books on the History and Philosophy of Science; 59. Memoria technica; 60. Errata.

This classification was devised to satisfy the needs of historians of science in general, rather than those of historians of particular sciences. For example, a student of the history of physiology will find only a few of the physiological items under the heading 36. Physiology. Studies devoted to definite physiologists would be found in the chronological section of Part I, and those devoted to, say, Hindu physiology in section 9. India of Part II. It would not take him very long, however, to glance through the whole bibliography and mark with a pencil the items pertinent to his own investigations. No method of classification can satisfy immediately every need, but we believe that ours is sufficiently clear to be of use to every scholar willing to take the few necessary pains.

I entreat the authors of relevant books and papers to send me copies of them as promptly as possible in order that their studies may be registered in our bibliographies and eventually reviewed and discussed. By so doing they will not simply help me and every other historian of science, but they will help themselves in the best manner.

Most of the notes were selected by me. They were typed by Miss FRANCES SIEGEL, and the typing and proofs read by Dr. A. POGO.

GEORGE SARTON

Harvard Library, 185
Cambridge 38, Mass. January 16, 1945

PART I.

FUNDAMENTAL CLASSIFICATION (CENTURIAL)

IXTH CENTURY B.C.

Fritz, K. von. *Noos* and *noein* in the Homeric poems. *Classical Philology*, 38, 79–93, 1943.

VIIITH CENTURY B.C.

Philippson, Paula. Genealogie als mythische Form. Studien zur Theogonie des HESIOD. 37 p. (*Symbolae Osloenses*, fasc. supplet. VII). Oslo, 1936.

IVTH CENTURY B.C. (*whole and first half*)

Jaeger, Werner. Paideia: the ideals of Greek culture. Translated from the German manuscript by GILBERT HIGHET. Volume II. In search of the Divine Centre. xviii+442 p. New York, Oxford University Press, 1943.

Reviewed by AUBREY DILLER, *Isis*, 35, 188–89, 1944.

IVTH CENTURY B.C. (*second half*)

Aristotle. Generation of animals. With an English translation by A. L. PECK. lxxviii+608 p. (Loeb Classical Library). Cambridge, Harvard University Press, 1943.

Reviewed by GEORGE SARTON, *Isis*, 35, 181, 1944.

DeWitt, Norman W. EPICURUS: all sensations are true. *Transactions and Proceedings of the American Philological Association*, 74, 19–32, 1943.

"The aim of this article is to show reasons for believing that the statement in the heading is false as usually understood. It is absurd; the documentation is deficient, misleading, and from prejudiced sources; advocates of its validity go beyond their authorities. It is inconsistent with EPICURUS' theory of perception, his terminology, his account of vision, his classifications, his treatment of the criteria in his Principal Doctrines, his account of heavenly phenomena in the letter to PYTHOCLES, and his recommendations to students. Ancient proofs of it are polemical sophistries. Modern misinterpretations have arisen from the ambiguity of *alethes*, which has three meanings in Epicureanism: 1. real or self-existent; 2. relatively true; 3. absolutely true. Sensations have been confused with judgments."

IST CENTURY B.C. (*second half*)

Knight, W. F. Jackson. Roman Vergil. viii+348 p. Faber and Faber, 1944.

Reviewed by R. G. AUSTIN, *Antiquity*, 18, 167–68, 1944.

Olson, Lois. Vergil and conservation. *Agricultural History*, 18, 153–55, 1944.

A paper in a series on pioneer soil conservationists of the Western Mediterranean World. C. Z.

IST CENTURY (*whole and first half*)

Hamilton, Robert A. B. Archaeological sites in the Western Aden protectorate. *Geographical Journal*, 101, 110–17, 1943.

"In the foothills of the Haid Dhiyan there is a system of hill aqueducts dating probably from the first or second centuries. They are V-shaped channels, carefully sited and plaster-lined, cut in the sides of the hills, so that rainwater was collected in them, carried into aqueducts, and taken out to the fertile land beyond the hills." C. W. A.

Mörland, Henning. CELSUS und die lateinischen Oribasiusübersetzungen. *Symbolae Osloenses*, 4, 68–71, 1926.

Wolfson, Harry A. PHILO on Jewish citizenship in Alexandria. *Journal of Biblical Literature*, 63, 165–68, 1944.

IST CENTURY (*second half*)

[Pliny the Elder]. The Elder PLINY's chapters on chemical subjects. Edited, with translation and notes by KENNETH C. BAILEY. Part I, 249 p.; Part II, 299 p. London, Edward Arnold, 1929–32.

"It has not always been easy to determine which passages should be included in a work of this description. I have been guided by the following principles. It seems clear that PLINY's Natural History can only be edited at the present day in an adequate manner by those who have a competent knowledge of the branches of science involved. This means that a complete edition must be made in sections, of which 'The Elder Pliny's Chapters on the History of Art' by JEX-BLAKE and SELLERS may be regarded as the first, and the present work (to be completed in two volumes) constitutes the second. The chapters on Botany, Zoology, Medicine, and other subjects must receive treatment from those who are expert in those sciences. When, therefore, it was necessary to take sections from the earlier books of the Natural History, books which consist mainly of non-chemical matter, only those sections which are directly concerned with chemical subjects were selected. On the other hand, the whole of Book XXXIII (except a few paragraphs already edited by JEX-BLAKE and SELLERS) has been included, even parts which have little connection with chemistry, for only thus can the whole of the Natural History be covered by such a scheme as I have outlined above."

Volume II contains the text and translation of parts from Books XXXIV to XXXVI. Elaborate notes and indices in both volumes. G. S.

IIND CENTURY (*whole and first half*)

Heegaard, Poul. P. Osl. 6. The date of the horoscope of Philoe. *Papyri Osloenses*, fasc. II, 146–51, Oslo, 1931.

"Among the papyri belonging to the University Library at Oslo is a horoscope cast for an otherwise unknown girl or lady named PHILOE. S. EITREM has edited it in *Papyri Osloenses*, fasc. I, 'Magical Papyri,' p. 21." According to HEEGAARD the date is close to March 11, 150 A.D. G. S.

Ptolemy's *Tetrabiblos or Quadripartite.* Being four books of the influence of the stars. Newly translated from the Greek paraphrase of PROCLUS with a preface, explanatory notes and an appendix. Containing extracts from the *Almagest* of PTOLEMY and the whole of his *Centiloquy* together with a short notice of Mr. RANGER's zodiacal planisphere and an explanatory plate, by J. M. ASHMAND. New edition. xxiv+164 p. Chicago, Aries Press, 1936.

Reviewed by GEORGE SARTON, *Isis*, 35, 181–82, facs., 1944.

IIIRD CENTURY (*second half*)

Merlan, Philip. PLOTINUS *Enneads* 2.2. *Transactions of the American Philological Association*, 74, 179–91, 1943.

IVTH CENTURY (*whole and first half*)

Haraszti, Zoltán. Two Donatus fragments. *More Books*, 20, 9–26, facs., Boston, 1945.

Apropos of the acquisition of two DONATUS fragments by the Boston Public Library; review of the intricate Coster-Gutenberg controversy. G. S.

IVTH CENTURY (*second half*)

Mørland, Henning. De codicibus librorum translatorum ORIBASII. *Symbolae Osloenses*, 7, 93–94, 1928.

Mørland, Henning. Zur neuen Oribasiusausgabe. *Symbolae Osloenses*, fasc. supplet. IV, Serta Rudbergiana, 53–56, 1931.

Mørland, Henning. ORIBASIUS Latinus. Erster Teil. iv+151 p. (*Symbolae Osloenses*, fasc. supplet. X). Oslo, Brøgger, 1940.

The author's first studies on the Latin versions of ORIBASIUS were published in the same series (no. 5, 1932; *Isis*, 24, 196). This volume contains the text of the two versions of books I–II printed in parallel columns. G. S.

Skard, Eiliv. Nemesiosstudien. *Symbolae Osloenses*, 15/16, 23–43, 1936; 17, 9–25, 1937; 18, 31–41, 1938; 19, 46–56, 1939.

Taylor, F. Sherwood. ST. JEROME and vitamin A. *Nature*, 154, 802, 1944.

VTH CENTURY (*whole and first half*)

Coster, C. H. SYNESIUS, a curialis of the time of the Emperor ARCADIUS. *Byzantion*, 15, 10–38, 1941.

Downey, Glanville. The calendar reform at Antioch in the fifth century. *Byzantion*, 15, 39–48, 1941.

VITH CENTURY (*second half*)

FitzGerald, Gerald M. A sixth century monastery at Beth-Shan (Scythopolis). 19 p., 22 pls. (Publications of the Palestine Section of the University of Pennsylvania, 4). Philadelphia, University of Pennsylvania Press, 1939.

Mørland, Henning. Zu einer neuen Ausgabe der "Nachträge zu ALEXANDER TRALLIANUS." *Symbolae Osloenses*, 12, 91–93, 1933.

VIITH CENTURY (*second half*)

Thomson, William. ISAAC OF NINEVEH. *Isis*, 35, 179, 1944.

VIIITH CENTURY (*whole and first half*)

[**Baeda Venerabilis**]. Bedae opera de temporibus, edited by CHARLES W. JONES. xiv+416 p. (The Mediaeval Academy of America, Publication no. 41). Cambridge, Mediaeval Academy of America, 1943.

Reviewed by HEINRICH HENEL, *American Historical Review*, 49, 694–96, 1944.

Chambers, R. W. BEDE. *Proceedings of the British Academy*, 22, 129–56, 1936.

Laistner, Max L. W. A hand-list of Bede manuscripts. With the collaboration of H. H. KING. x+168 p. Ithaca, Cornell University Press, 1943.

Reviewed by FREDERICK M. CAREY, *American Historical Review*, 49, 781, 1944.

VIIITH CENTURY (*second half*)

Kraus, Paul. JĀBIR IBN ḤAYYĀN. Contribution à l'histoire des idées scientifiques dans l'Islam. Vol. I: Le corpus des écrits jabiriens. xlv+214 p. Vol. II: JABIR et la science grecque. xvi+406 p. (Mémoires présentés à l'Institut d'Egypte etc., T. 44 et 45). Le Caire, 1942–43.

Reviewed by MAX MEYERHOF, *Isis*, 35, 213–17, 1944.

Walpole, Ronald N. CHARLEMAGNE and ROLAND. University of California Publications in Modern Philology, 21, 385–402, Berkeley, 1944.

Reviewed by URBAN T. HOLMES, JR., *Speculum*, 19, 511–12, 1944.

IXTH CENTURY (*second half*)

Kraus, Paul (1904–44) and **Muḥammad Ṭāhā al-Ḥājirī.** [Various essays of AL-JĀḤIẒ now published for the first time]. 12+127 p., all in Arabic. Cairo, League to promote compositions, translations and publications, 1943.

The much lamented PAUL KRAUS, from whom so many more gifts might have been confidently expected, gave us in this book four unknown essays of the great 'Irāqī man of letters AL-JĀḤIẒ (died 868; *Introd.* 1, 597). After a muqaddama of 9 p., we are offered a critical edition of four philosophical essays dealing, respectively, with (1) The present life and the future one, (2) The keeping of secrets and holding one's tongue, (3) Seriousness and frivolity, (4) Envy and enmity. These essays do not concern immediately the historian of science, but AL-JĀḤIẒ was so great a personality in the Arabic literary world that everything he wrote should be taken into account for the understanding of life and culture about the middle of the ninth century. G. S.

Sage, Carleton M. PAUL ALBAR of Cordoba: studies on his life and writings. xii+239 p. (The Catholic University of America Studies in Mediaeval History, new series, vol. 5). Washington, Catholic University of America Press, 1943.

Reviewed by CHARLES UPSON CLARK, *American Historical Review*, 49, 780, 1944. PAULUS ALBARUS d. c.861.

Vernadsky, George. The date of the conversion of the Khazars to Judaism. *Byzantion*, 15, 76–86, 1941.

"The Khazars must have been officially converted to Judaism some time between A.D.862 and 866. We may add that IBN AL-FAQIH, in his revision of IBN KHORDADBEH's book, makes the following statement: 'The Khazars are all Jews, and it is but recently that they have accepted Judaism.' IBN AL-FAQIH wrote around A.D. 903. His words fit in well into the picture in case we date the Khazar conversion by the 860's." In my *Intr.* (vol. 1, 680) it was said that the Khazars were converted to Judaism c. 740, and that some of them became Christians in 860.

XTH CENTURY (*second half*)

Levonian, Lootfy. The Ikhwān al-ṣafa' and Christ. *Moslem World*, 35, 27–31, 1945.

Vogt, Albert (editor). CONSTANTIN VII Porphyrogénète, Le livre des cérémonies. 2 vols. (Collection byzantine publiée sous le patronage de l'Association Guillaume Budé). Paris, Société d'édition "Les Belles Lettres," 1935.

Reviewed by G. VERNADSKY, *Byzantion*, 15, 500–02, 1941.

XITH CENTURY (*whole and first half*)

Tschan, Francis J. SAINT BERNWARD of Hildesheim. 1. His life and times. vii+235 p. (Publications in Mediaeval Studies, The University of Notre Dame, VI). Notre Dame, Indiana, 1942.

Life of a Saxon Benedictine born c. 960; bishop of Hildesheim in 993; died in that city 1022. He was not

only a great churchman, later canonized, but also one of the greatest patrons of art. The city of Hildesheim is deeply indebted to him, its thirteenth bishop. Who does not know the marvelous bronze doors (c.1015) of the Hildesheim cathedral? This volume is biographical; let us hope that it will soon be followed by another explaining the genesis of the artistic creations. G. S.

Whitehill, Walter Muir. Spanish Romanesque architecture of the eleventh century. xxiv+307 p., 128 pls., 113 figs. Oxford University Press, 1941.

Reviewed by KENNETH JOHN CONANT, *Speculum*, 19, 366–71, 2 figs., 1944.

XITH CENTURY (*second half*)

Bell, Richard. A Moslem thinker on the teaching of religion. AL-GHAZZĀLĪ A.D. 1058–1111. *Hibbert Journal*, 42, 31–36, 1943.

McCarthy, Barbara P. Literary reminiscences in PSELLUS's Chronographia. *Byzantion*, 15, 296–99, 1941.

XIITH CENTURY (*whole and first half*)

Alonso, Manuel (S.J.). El "Liber de causis." *Al-Andalus*, 9, 43–69, 1944.

The *Liber de causis* has been ascribed to many authors. We discussed it briefly under V-2 (*Intr.* 1, 404). According to Father ALONSO the ascription to JOHN OF SEVILLE, IBN DÂ'ŪD (XII–1), is the most convincing. G. S.

González Palencia, Angel. El Arzobispo don RAIMUNDO DE TOLEDO. 200 p., 8 ills. (Colección Pro Ecclesia et Patria). Barcelona, Editorial Labor, 1942.

Reviewed by MANUEL ALONSO (S.J.), *Al-Andalus*, 9, 254–56, 1944.

Lewis, Henry (editor). Brut Dingestow. lvii+327 p., front. Cardiff, University of Wales Press, 1942.

Reviewed by KENNETH JACKSON, *Speculum*, 19, 510–11, 1944. "Brut y Brenhinedd is the name given in Welsh to the various translations of the *Historia Regum Brittaniae* of GEOFFREY OF MONMOUTH. One of the most important of these is that contained in the Dingestow Court MS., which the present editor, following the opinions of IDRIS BELL and ROBIN FLOWER, dates as written about 1300. This version is here edited for the first time."

XIITH CENTURY (*second half*)

Moore, Philip S.; Dulong, Marthe. Sententiae Petri Pictaviensis. 1. lvii+326 p. (Publications in Mediaeval Studies, The University of Notre Dame, VII). Notre Dame, Indiana, 1943.

Critical edition of the first book of the *Sententiarum libri V* written in Paris before 1176, probably before 1170. PETER OF POITIERS was born in or near Poitiers, c.1130, taught theology from 1167 on, was chancellor of the University of Paris from 1193 to his death in 1205. It has been claimed that the phenomenal success of the *Sentences* of PETER THE LOMBARD (XII–2) was due to PETER OF POITIERS. However, the latter refers to the former only twice in his own *Sentences*. The text has been edited with great care and is well annotated. Let us hope that the four remaining books will be promptly published. We owe Father MOORE a general study on PETER OF POITIERS, forming vol. 1 of the same collection (Notre Dame 1936; *Isis*, 31, 510). G. S.

Sanford, Eva Matthews. The *Verbum Abbreviatum* of PETRUS CANTOR. *Transactions and Proceedings of the American Philological Association*, 74, 33–48, 1943.

"The life and influence of PETRUS CANTOR are surveyed briefly as background for the major topic of this paper, a study of his use of classical citations and *exempla* in the *Verbum Abbreviatum*, to illustrate the place of ancient literature in a handbook intended for the moral guidance of the Paris clergy in the late twelfth century."

William, Archbishop of Tyre. A history of deeds done beyond the sea. Translated and annotated by EMILY ATWATER BABCOCK and A. C. KREY. 2 volumes. xii+556 p.; 553 p. (Records of Civilization, Sources and Studies, no. 35). New York, Columbia University Press, 1943.

Reviewed by JOHN L. LAMONTE, *American Historical Review*, 49, 696–97, 1944.

XIIITH CENTURY (*whole and first half*)

Callus, D. A. Introduction of Aristotelian learning to Oxford. 56 p. (Proceedings of the British Academy). London, Humphrey Milford, 1944.

Copious bibliographical notes. "There is still much ground to be explored . . . nevertheless, we may confidently state that (a) The introduction of Aristotelianism to Oxford took place some time between 1206 and 1209. The new learning came to Oxford almost at the same time that it reached Paris. (b) The development and growth of Aristotelian learning in Oxford is attested by the writings of ROBERT GROSSETESTE, ADAM OF BUCKFIELD, RICHARD FISHACRE, and other masters whose works are still unpublished. Its influence was wide and deep. By the middle of the thirteenth century it had covered in range the whole corpus Aristotelicum vetustius, and its technique had reached the perfection we admire in ADAM OF BUCKFIELD. That influence increased and deepened as we can see towards the close of the century in the commentaries of SIMON OF FAVERSHAM. Naturally, it was widest and deepest in the Faculty of Arts, but, in spite of strong opposition, it also made itself felt in the Faculty of Theology, among the secular as well as among the Dominican and Franciscan masters. It seems clear that before the end of the

thirteenth century the movements that were to make fourteenth-century Oxford famous had already gained impetus." C. W. A.

Friedman, Lee M. ROBERT GROSSETESTE and the Jews. iv+34 p., 3 illus. Cambridge, Harvard University Press, 1934.

"STEVENSON has described GROSSETESTE's achievements as having a threefold aspect, first, as a reformer who contributed to the great religious revival of the thirteenth century, second, as the teacher who guided the rising fortunes of the University of Oxford, and third, as the statesman who endeavored to combine into one united effort the struggle of the clergy for the liberty of the Church and the struggle of the laity for the liberties of the nation. Along with all these great achievements is the memorable fact that his is the earliest extant English expression of sympathetic understanding of the anomalous and unhappy condition of the mediaeval Jew."

Grégoire, Henri. The question of the diversion of the fourth Crusade, or, An old controversy solved by a Latin adverb. *Byzantion*, 15, 158–166, 1941.

Holcomb, R. C. Master JOHANNES JAMATI (JAMERIUS JAMASCICUS), a forgotten military surgeon. *Bulletin of the History of Medicine*, 16, 239–45, 1 pl., 1944.

Penuela, J. M. (S.J.). "Die Goldene" des IBN AL-MUNĀṢIF. xix+184 p. Rome, Päpstliches Bibelinstitut, 1941.

Reviewed by M. SPRENGLING, *Journal of Near Eastern Studies*, 2, 316, 1943. Edition of an Arabic text of physiognomy not mentioned in my *Introduction* (BROCKELMANN 1, 497). G. S.

Voegelin, Eric. The Mongol orders of submission to European powers, 1245–1255. *Byzantion*, 15, 378–413, 1941.

Wood, Casey A.; Fyfe, F. Marjorie. (transl. and edit.). The art of falconry, being the *De arte venandi cum avibus* of FREDERICK II of Hohenstaufen. cvi+637 p., 186 pls. Stanford Univ., Calif., Stanford University Press, 1943.

Reviewed by HANS J. EPSTEIN, *Isis*, 35, 182–84, 1944.

XIIITH CENTURY (*second half*)

Olschki, Leonardo. Medical matters in MARCO POLO's *Description of the World*. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 237–59, Baltimore, 1944.

Silva Carvalho, Augusto da. Le manuscrit du *Régime du corps* d'ALDEBRANDINO, de la Bibliothèque d'Ajuda, à Lisbonne. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 318–24, 3 figs., Baltimore, 1944.

XIVTH CENTURY (*whole and first half*)

Charanis, Peter. Internal strife in Byzantium during the fourteenth century. *Byzantion*, 15, 208–30, 1941.

Cioffarri, Vincenzo. A Dante note — Smeraldo. *Speculum*, 19, 360–63, 1944.

Della Vida, Giorgio. An Arabic block print. *Scientific Monthly*, 59, 473–74, 1944.

An account of the discovery of an Arabic block print of the fourteenth century in the MSS collection of the University of Pennsylvania Museum. This is apparently the only specimen of these extremely rare objects now known to be in America. C. Z.

Flaumbaum, Isidoro. Meister ECKHART y MARTIN HEIDEGGER. *Minerva*, 1, 50–54, Buenos Aires, 1944.

Mary Francis Xavier, Sister. Saffron and pepper in fourteenth century Florence. *Pharmaceutical Archives*, 15, 37–44, 1944.

XIVTH CENTURY (*second half*)

Charanis, Peter. The strife among the PALAEOLOGI and the Ottoman Turks, 1370–1402. *Byzantion*, 16, 286–314, 1944.

Della Vida, G. Levi. "Chrestiens de la saincture." *Modern Language Notes*, 59, 484–87, 1944.

Apropos of an expression used by OGIER OF ANGLURE (XIV–2). The "Christians of the girdle" is an alternative name given by him to the Christians of St. Thomas, a Nestorian sect of the Malabar Coast. Native Christians (not only Christians of St. Thomas) were allowed to reside in Jerusalem and other oriental cities but obliged to wear blue girdles (Arabic *zunnār*, from Greek *zōnárion*) and turbans. SIMONE SIGOLI (1384) explained the phrase "Cristiani della cintura" with a reference to ST. THOMAS, hence the mistake; ANGLURE repeated and aggravated that mistake, which does not mean that he copied SIGOLI; both SIGOLI and he were probably deceived by the same local tradition. G. S.

Dominici, Giovanni (1356–1419). Joannis Dominici *Lucula noctis*, [edited] by EDMUND HUNT. xxxi+432 p. (Publications in Mediaeval Studies, The University of Notre Dame, IV). Notre Dame, Indiana, 1940.

"Early humanists felt it necessary to prove that pagan literature was actually an ally of religion. Mediaeval conservatives built up opposing proofs. IOANNES DOMINICI, a Dominican friar, was of the conservative school in Florence and wrote his *Lucula noctis* in order to refute the famed humanist COLUCCIO SALUTATI. The work has forty seven chapters, each beginning with succeeding let-

ters of the text with which he begins: 'Lux in tenebris lucet et tenebre eam non comprehenderunt.' The work is particularly useful in that it presents the views of both sides: DOMINICI in the scholastic manner first collected all the humanists' proofs in twelve chapters and then proceeded to combat them. Several years ago the University of Chicago purchased a manuscript of the *Lucula* at the urging of Professor B. L. ULLMAN, who has shown it to be the one actually sent by DOMINICI to SALUTATI. A new edition of the *Lucula* is now necessary: the first edition in 1908 by REMI COULON did not even use this most important manuscript; neither did NOVATI in his edition of the letters of SALUTATI, in spite of the fact that this work is a necessary complement to two of the letters: the one which gave rise to the *Lucula*, the other, SALUTATI's unfinished reply to it. The COULON edition is faulty on numerous other counts."

COLUCCIO SALUTATI (1331–1406) is too well known to require an introduction; GIOVANNI DOMINICI was born in 1356, assumed the Dominican habit, wrote many Biblical commentaries and religious treatises, refused to be a general of his order, but was made a cardinal and archbishop of Ragusa by GREGORY XII (1406–15); he attended the Council of Constance and was sent by MARTIN V (1417) to Hungary and Bohemia to heal the schism; he died in Budapest in 1419. He wrote the *Lucula noctis* in 1405. The editor has added a good introduction including a summary of SALUTATI's and DOMINICI's arguments. His work has been done apparently with great care; the lack of an index is the more shocking. G. S.

Funk, Arthur Layton. ROBERT LE COQ and ETIENNE MARCEL. *Speculum*, 19, 470–87, 1944.

Goodrich L. Carrington. Answer to Query no. 105 (*Isis*, 35, 177). Note on a few early Chinese bombards. *Isis*, 35, 211, 4 figs. on 2 pls., 1944.

Hershman, Abraham M. Rabbi ISAAC BEN SHESHET PERFET and his times. xii+263 p. New York, Jewish Theological Seminary of America, 1943.

Rabbi ISAAC BEN SHESHET PERFET, nicknamed RIBASH, was born in Barcelona in 1326; in 1372 he was called to Saragossa, capital of Aragon, to be rabbi and director of the yeshibah; in 1385 he accepted a similar appointment in Valencia. The terrible persecutions of 1391, beginning in Seville, spreading to Cordova, Toledo, Aragon, Majorca, Valencia obliged him like many others to find refuge in North Africa. He first settled in Tunisia, then in Algeria. He spent the end of his life in Algiers where he died in 1408 in great renown; his tomb became a place of pilgrimage. The tombstone (which was lying flat upon the grave according to Sephardic usage) having been desecrated, it was replaced by a new one with the inscription on the hidden side. That epitaph was rediscovered in 1896, when public works caused the removal of PERFET's tomb (as well as that of his rival, SIMON DURAN). PERFET's name was derived from the fact that his ancestor prince SHESHET had been prefect or baile of the count of Barcelona.

RIBASH was one of the great Spanish talmudists, a follower of his teacher Rabbenu NISSIM GERUNDI (d. 1375). Another teacher of his was HASDAI CRESCAS the Elder and one of his best friends the latter's grandson, HASDAI CRESCAS the Younger, author of *Or Adonai*. RIBASH left a collection of 518 responsa dating from 1368 to 1407. He was often quoted by JOSEPH QARO in the *Shulhan 'aruk* (1564).

His task in Algiers was a very difficult one. It was necessary to restore Jewish usage and to harmonize the conflicting traditions of the native Jews with those of a great mass of refugees who had come from Toledo, Valencia, Majorca and Barcelona. In this he was often contradicted by his younger colleague, the Majorcan SIMON DURAN (1361–1444). He loved peace, learning, and truth. He said "Truth remains truth whether it be accepted or not." He was neither scientifically minded nor a qabbalist; he was very moderate and disliked the over-scrupulous (mityahadim).

The author has given us a faithful portrait of RIBASH and a good account of his environment in Spain and Africa. Conditions in Spain in the last decade of the century must have been terrible, the worst being due to the Jewish informers (malshin, hence Sp. malsín) betraying their brethren. We can appreciate this better, because similar criminals were the sorest plague in the countries occupied by Germans. Chapters 17–18 contain information on RIBASH' correspondents and the important persons named by him. The author has tried to reconstruct the chronological sequence of the responsa. His book is a valuable addition to the study of Spanish Jewry, to be read in connection with ABRAHAM A. NEUMAN: *The Jews in Spain* (1942; *Isis*, 35, 40). G. S.

Sarton, George. Query no. 105. A Chinese gun of 1378? *Isis*, 35, 177, 1944.

Smith, Robert S. Fourteenth-century population records of Catalonia. *Speculum*, 19, 494–501, 1944.

XVTH CENTURY (*whole and first half*)

Süleyman Chelibi (d. Bursa 1421). The Mevlidi Sherif. Translated by F. LYMAN MACCALLUM. 44 p. (Wisdom of the East series). London, Murray, 1943. 1/6.

"In the days of TAMERLANE, SÜLEYMAN CHELEBI was one of the royal chaplains of Sultan BEYAZID the Thunderbolt. When TAMERLANE overthrew BEYAZID, SÜLEYMAN found refuge as chief-priest of the Great Mosque at Bursa. There he composed c. 1409 the Mevlidi Sherif (The birth-song of the Prophet) to confute a teaching that MUHAMMED was no greater than other prophets. The poem . . . is much loved by the people of Turkey. It is recited at times of thanksgiving and sorrow and on many special occasions. An authority on Turkey said recently: 'No one can know what MUHAMMED means to a Turk unless he is familiar with this poem.'"

XVTH CENTURY (*second half*)

Brant, Sebastian. The ship of fools. Translated into rhyming couplets, with introduction and com-

mentary by EDWIN H. ZEYDEL. ix+399 p. New York, Columbia University Press, 1944.

Reviewed by M. F. A. MONTAGU, *Isis*, 35, 217, 1944.

Bühler, Curt F. Scientific and medical incunabula in American libraries. *Isis*, 35, 173–75, 1944.

Coomaraswamy, Ananda K. The iconography of DÜRER's "knots" and LEONARDO's "concatenation." *Art Quarterly*, 109–28, 18 figs., Spring 1944.

Ficino, Marsilio. MARSILIO FICINO's Commentary on PLATO's Symposium. The text and a translation, with an introduction by SEARS REYNOLDS JAYNE. 247 p. (University of Missouri Studies, 19). Columbia, University of Missouri, 1944.

Fulton, John F. Hand list of editions of POLYDORE VERGIL's *De inventoribus rerum*. Compiled and arranged from a bibliography in manuscript by the late Professor JOHN FERGUSON. With an Appendix on *Anglica historia*. 15 p. (typescript). New Haven, Conn., Yale University School of Medicine, Historical Library, 1944.

"The following hand list of the ninety editions of POLYDORE VERGIL's *De inventoribus rerum* has been arranged from a bibliography, still in manuscript, prepared by the late Professor JOHN FERGUSON of Glasgow. He had enumerated all editions chronologically regardless of language, including those he regarded as 'possible' and 'doubtful.' Herein they are arranged according to language (the original Latin first, followed by translations); then follow those of which Professor FERGUSON had sufficient evidence to consider as possibly existing. Finally, there are ten 'doubtful' entries with Professor FERGUSON's citations relating to them." "Because of special interest in VERGIL's *Anglicae historiae libri XXVI*, an appendix listing the twelve editions of this work has been added."

Fulton, John F. POLYDORE VERGIL, his chapters on the history of physick and his *Anglica historia*. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 65–88, 10 figs., Baltimore, 1944.

Hinks, A. R. The lettering of the Rome Ptolemy of 1478. *Geographical Journal*, 101, 188–90, 1943.

Evidence that the names on these first copper-plate maps were punched, as on the cover of a binding, and not engraved. C. W. A.

[Leonardo da Vinci, 1452–1519]. The Literary works of LEONARDO DA VINCI, compiled and edited from the original MSS by JEAN PAUL RICHTER (1847–1937). Second edition, enlarged and revised by JEAN PAUL RICHTER and IRMA A. RICHTER. 2 vols., 894 p., 135 collotype pls., 450 ills. London, Oxford University Press, 1939.

Reviewed by GEORGE SARTON, *Isis*, 35, 184–87, 1944.

[Leonardo da Vinci]. The notebooks of LEONARDO DA VINCI, arranged, rendered into English and introduced by EDWARD MACCURDY. 2 vols., 1296 p., 70 pls. New York, Reynal and Hitchcock, 1938.

Reviewed by GEORGE SARTON, *Isis*, 35, 185–87, 1944.

XVITH CENTURY (*whole and first half*)

C. NATURAL SCIENCES

Nichols, Madaline W. An old questionnaire for modern use: a commentary on *Relaciones Geográficas de Indias*. *Agricultural History*, 18, 156–60, 1944.

During the sixteenth century the Spanish government sent numerous questionnaires to the authorities in their American colonies in order to collect information which was necessary for their future development. These included questions on climate, aborigines, topography, geology, flora, fauna, crops, etc. Much of this interesting information is still hidden away in old Spanish colonial records. C. Z.

D. MEDICAL SCIENCES

Dellepiane, Luis. Los conocimientos anatómicos de AMBROSIO PARÉ. *Revista argentina de historia de la medicina*, v. 3, no. 3, 25–35, 1944.

Lastres, Juan B. El médico de Almagro. *Anales de la Sociedad Peruana de Historia de la Medicina*, 6, 27–35, 1944.

Mayer, Claudius F. Mignotydea. An undescribed epidemiological monograph of the Cinquecento. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 184–204, 1 fig., Baltimore, 1944.

Apropos of the *Mignotydea de peste* printed in Milano, 1535, and its author, GIAMMARIA MIGNOTO. Mignotydea = Mignoti idea. "Summarizing MIGNOTO's etiological views, we find that he was on the right track of truth. He considered man a part of the large world, whose existence depends — not to mention God, the constant factor in everything — chiefly upon his environment: the air which surrounds him, and the weather and its changes; the water and the ground; the food; also upon his habits in eating, drinking, working, resting, sleeping, affections and sex life. There is a normal balance between man and his Universe; when one or the other comes out of gear, epidemic diseases will result. These may descend from the sky with the air's vapors, and are carried on by wind or weather. They may come from food and drink, or they may develop by themselves in neglected, unsanitary towns. Since there are many

sources of contagium, there are also many varieties of pestilential fevers." "MIGNOTO's views on the importance of quarantine, on the sanitation of towns, on the hospitalization of the sick, and on disinfection of what the sick might have touched show clearly that he is one of the early promoters of the doctrine on contagium. He may talk of the influence of stars and the evil deeds of demons, but by his actions he reveals his firm conviction that epidemics are transmitted and spread by contact with the infective matter, the contagium; a view which eleven years later (1546) was widely promulgated by FRACASTORO, whose work — perhaps better advertised, and published in a larger number of copies than the *Mignotydea* — became the starting point of the long fight between contagionists and anticontagionists carried on throughout the 16th and 17th century epidemiological literature." G. S.

Paoli, Humberto Giulio. BATISTA NICOLAS MONARDES, medico di Sevilla (1508–1588). *Petrus Nonius*, 5, 5–17, 105–132, 8 figs., 1944.

Paz Soldán, Carlos Enrique. El cuatricentenario de la "Fábrica" de ANDREAS VESALIUS, y las bases anatómicas de la Escuela Médica de Lima. *Anales de la Sociedad Peruana de Historia de la Medicina*, 6, 3–25, figs., 1944.

[VESALIUS]. The four hundredth anniversary celebration of the *De humani corporis fabrica* of ANDREAS VESALIUS. 67 p., frontispiece. New Haven, The Historical Library, Yale University School of Medicine, 1943 ($2.50, without discount).

"Reprinted from *The Yale Journal of Biology and Medicine*, December 1943, vol. 16, pp. 105–150. A description of the VESALIUS exhibit has been added in this reprint." Contents: JOHN F. FULTON, Introduction; ERNST A. CASSIRER, The place of VESALIUS in the culture of the Renaissance; EDWARD CLARK STREETER, VESALIUS at Paris; CARL PURINGTON ROLLINS, OPORINUS and the publication of the *Fabrica*; ARTURO CASTIGLIONI, The attack of FRANCISCUS PUTEUS on ANDREAS VESALIUS and the defence by GABRIEL CUNEUS; Rev. GEORGE STEWART, Benediction; An exhibit arranged at the Yale Medical Library to commemorate the 400th year of publication of ANDREAS VESALIUS' *De humani corporis fabrica*.

This is a very interesting pamphlet, but the price charged for it (a reprint) is outrageous. G. S.

E. ALIA

Johnson, Francis R. Latin versus English: the sixteenth-century debate over scientific terminology. *Studies in Philology*, 41, 109–35, 1944.

XVITH CENTURY (*second half*)

B. PHYSICAL SCIENCES AND TECHNOLOGY

Chapman, Sydney. WILLIAM GILBERT and the science of his time. *Nature*, 154, 132–36, 1944.

Langdon-Brown, Sir Walter. WILLIAM GILBERT: his place in the medical world. *Nature*, 154, 136–39, 1944.

C. NATURAL SCIENCES

Allen, Elsa G. JAQUES LE MOYNE, first zoological artist in America. *The Auk*, 55, 106–11, 1 pl., 1938.

JACQUES LE MOYNE was born in Dieppe, c. 1530; visited America in 1564; died in London, 1588. G. S.

Allen, Elsa G. Some sixteenth century paintings of American birds. *The Auk*, 53, 17–21, 1 pl., 1936.

"TOPSELL's work, 'Fowles of Heauen' [1613], is primarily a treatise on European birds, but it lists seventeen American species which in various ways had become known to the author, although he never visited America. The subject of the present paper, in contrast to TOPSELL's account, represents work, done in America, by a painter, one JOHN WHITE, also called JOHN WITH, who, as artist and draughtsman, accompanied Sir THOMAS HARIOT in 1585 on that ill-starred expedition sent out by Sir WALTER RALEIGH to found an English colony in America. He was chosen by Queen ELIZABETH for the express purpose of studying and painting the aborigines and 'natural products' of this far country."

Reed, Howard S. An account of sixteenth-century agriculture on the Mexican Plateau. *Journal of the Washington Academy of Sciences*, 34, 209–13, 1944.

Information derived from JUAN BAUTISTA POMAR: *Relaciones de Texcoco*, 1582, recently reprinted in Mexico (1941).

D. MEDICAL SCIENCES

Proskauer, Curt. Der Zahnbrecher des HANS SACHS. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 267–82, facsimiles, Baltimore, 1944.

E. ALIA

Johnson, Francis R. Thomas Hill: An Elizabethan Huxley. *Huntington Library Quarterly*, 7, 329–51, 1944.

"During the first half of Queen ELIZABETH's reign no one was more diligent in compiling and publishing handbooks of useful learning than a London citizen named THOMAS HILL. Though his scientific attainments cannot sustain comparison with those of THOMAS HENRY HUXLEY, HILL performed for his age a role analogous to that which HUXLEY played so well in Victorian England. He was the active leader in expounding the mysteries of science in simple terms for unlearned laymen. His manuals of practical scientific lore range from treatises on physiognomy and on gardening to a textbook of astronomy." This first biography of HILL corrects the notice included in DNB. HILL was born probably in London,

c. 1528; he was dead by 1576. JOHNSON's paper includes a reprint of HILL's autobibliography of 1571, and a bibliography of his writings. G. S.

Mondolfo, Rodolfo. La filosofía de GIORDANO BRUNO (Gnoseología, metafísica, etica). *Minerva*, 1, 5–26, Buenos Aires, 1944.

Utley, Francis Lee. The crooked rib. An analytical index to the argument about women in English and Scots literature to the end of the year 1568. xiii+368 p. (Ohio State University, English Series). Ohio State University Press, 1945 ($4.00).

XVIITH CENTURY (*whole and first half*)

A. MATHEMATICS

Boyer, Carl B. Analytic geometry: the discovery of FERMAT and DESCARTES. *The Mathematics Teacher*, 37, 99–105, facs., 1944.

Galdston, Iago. DESCARTES and modern psychiatric thought. *Isis*, 35, 118–28, 1944.

B. PHYSICAL SCIENCES AND TECHNOLOGY

Pagel, Walter. J. B. VAN HELMONT (1579–1644). *Nature*, 153, 675–76, 1944.

"'Gas' as a chemical entity cannot be separated in his writings from its philosophical connotation. This is the stumbling block for most scientific readers." C. W. A.

Tomkis, Thomas. Albumazar: a comedy [1615]. Edited by HUGH G. DICK. ix+217 p. (University of California Publications in English, 13). Berkeley, University of California, 1944.

This is a valuable contribution to the history of astrological thinking in England, for the play is a general satire on charlatans and the gullibility of their victims. The play will interest historians of science also, because it is a close adaptation of an Italian play, *Lo astrologo* (Venice 1606), written by no less a person than GIAMBATTISTA DELLA PORTA (1535–1615) whose *Magia naturalis* (1588) is one of the most curious scientific books of the sixteenth century. A substantial part of DICK's introduction is devoted to the intellectual background, the war against judicial astrology. The English play is far less severe on the astrologers than the Italian one, less outspoken; in both plays astrology is not the only superstition to be criticized, for alchemy, metoscopy, and necromancy come in for their share of ridicule. G. S.

C. NATURAL SCIENCES

Burr, Malcolm. MOFFET's *Insectorum theatrum* 1634. *The Field*, 495, August 27, 1938.

Heawood, Edward. An unrecorded Blaeu world map of c. 1618. *Geographical Journal*, 102, 170–75, 2 pls., 1943.

Made by WILLEM JANZY BLAEU. Owner W. A. FOSTER of Bath. Dated from internal evidence. Geography generally similar to that of contemporary Dutch maps, but stands alone in its records of compass deviations and ocean currents. The plates reproduce the S.W. part of South America and the E. of North America. C. W. A.

Mullett, Charles F. GERVASE MARKHAM: scientific amateur. *Isis*, 35, 106–18, 1944.

D. MEDICAL SCIENCES

Izquierdo, J. Joaquín. Lugar de HARVEY en la historia del método científico de la biología. *Anales de la Escuela Nacional de Ciencias Biológicas*, 3, 266–96, Mexico, 1944.

Professor IZQUIERDO's studies on HARVEY have been attractively continued in this interesting study which has been separately published by the Department of Physiology of the Faculty of Medicine of the National University of Mexico, with a note by CHARLES H. BATEMAN. Professor IZQUIERDO, who prepared the first Spanish translation with annotations of HARVEY's *De motu cordis* (Mexico, 1936), discusses here HARVEY's relation, in the development of the scientific method in biology, to ARISTOTLE, GALEN, and HARVEY's more immediate predecessors in the sixteenth century. C. D. L.

Izquierdo, J. Joaquín. Lugar de HARVEY en la historia del método científico de la biología. Con un preámbulo por CHARLES H. BATEMAN. 38 p., figs. Universidad Nacional Autónoma de México, México, D.F., 1944.

Neuburger, Max. Some relations between British and German medicine in the seventeenth century. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 223–36, 1 facsimile, Baltimore, 1944.

Pina, Luís de. Os portugueses FRANCISCO SANCHES e ZACUTO LUSITANO na história da anatomia. *Petrus Nonius*, 5, 145–92, 1 fig., 1944.

FRANCISCO SANCHES (born 1550, died Toulouse 1623). ZACUTO LUSITANO (born Lisbon 1575, circumcized Amsterdam 1625; died in 1642).

E. ALIA

Comenius, John Amos. The angel of peace. Edited by MILOS SAFRANEK. Introduction by MATTHEW SPINKA. 127 p., frontispiece. New York, Pantheon Books (n.d.).

Latin-English edition of the appeal for peace (see title-page of first edition in *Isis*, 30, 449) which COMENIUS sent to the English and Dutch envoys to the conference of Breda in May, 1667. The reprinting of this little book is timely, but it is not as elegant as one might have expected it from the Pantheon Press. G. S.

Forbes, Allyn Bailey (editor). Winthrop papers. Volume III, 1631–1637. xl+544 p. Boston, Massachusetts Historical Society, 1943.

Reviewed by VIOLA F. BARNES, *American Historical Review*, 49, 745–46, 1944.

XVIIth CENTURY (*second half*)

A. MATHEMATICS

Connor, Elizabeth. Sir ISAAC NEWTON, the pioneer of astrophysics. Astronomical Society of the Pacific, Leaflet no. 158, 8 p., April, 1942.

[NEWTON]. Isaac Newton, 1643–1943. (In Russian). 82 p., 4 pls. Kazan, Kazan Aviation Institute, 1943.

Reviewed by J. J. BIKERMAN, *Nature*, 154, 192, 1944.

C. NATURAL SCIENCES

Allen, Elsa G. NICOLAS DENYS, a forgotten observer of birds. *The Auk*, 56, 283–90, 1939.

NICOLAS DENYS, born at Tours in 1598, came to Acadia in 1632, died at Nepisiguit (New Brunswick) in 1688. His "Description géographique des costes le l'Amérique septentrionale avec l'histoire naturelle du pais" was published in Paris, 1672. "While in the main his observations on birds are good, and bespeak a critical eye, they are damaged by an admixture of inaccuracy and in some of his descriptions, for example, that of the wolverine and its method of killing moose, and the Barred Owl and its habit of harboring and caring for live mice, we feel that he was not entirely above the weakness of writing to please his public. Likewise the erroneous distribution of some birds, as the spoonbill, indicated by DENYS is proof that his writing was not entirely a record of his own observations, but it contained also a considerable amount of hearsay and folk belief." G. S.

Crone, G. R. Seventeenth-century Dutch charts of the East Indies. *Geographical Journal*, 102, 260–65, 3 pls., 1943.

Drawn on parchment probably about 1655–70 for the Dutch East India Company. C. W. A.

Montagu, M. F. Ashley. TYSON'S *Orang-Outang, sive Homo Sylvestris* and SWIFT'S *Gulliver's Travels*. PMLA, 59, 84–89, 2 figs., 1944.

D. MEDICAL SCIENCES

Adams, C. W. Answer to Query no. 61 concerning JOHANNES SCULTETUS (*Isis*, 25, 452–54; see also 27, 63–64; 29, 408). *Isis*, 35, 212, 1944.

Edelstein, Ludwig. SYDENHAM and CERVANTES. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 55–61, Baltimore, 1944.

Apropos of SYDENHAM'S bon mot as reported by Sir RICHARD BLACKMORE in the latter's *Treatise upon the Small Pox* (1723): "And to shew the Reader what Contempt he had for Writings in Physick, when one Day I asked him to advise me what Books I should read to qualify me for Practice, he replied, Read *Don Quixot*, it is a very good Book, I read it still. So low an Opinion had this celebrated Man of the Learning collected out of the Authors, his Predecessors." G. S.

XVIIIth CENTURY (*whole and first half*)

A. MATHEMATICS

Beattie, Lester M. JOHN ARBUTHNOT, mathematician and satirist. xvi+432 p., 3 illus. (Harvard Studies in English, 16). Cambridge, Harvard University Press, 1935.

"JOHN ARBUTHNOT [1667–1735?], favorite physician to Queen ANNE, was the author of numerous satirical works, a popularizer of mathematics and science, a politician, a brilliant controversialist, and the friend or enemy of every noted person in the early eighteenth century." Among his works the most interesting to us are: An essay on the usefulness of mathematical learning (1701); The laws of chance (1692), largely a translation of HUYGENS' *De ratiociniis in ludo aleae*; Argument for divine providence taken from the constant regularity observed in the births of both sexes (1710).

Connor, Elizabeth. ABRAHAM SHARP, 1653–1742. *Publications of the Astronomical Society of the Pacific*, 54, 12–18, Dec. 1942.

C. NATURAL SCIENCES

Allen, Elsa G. New light on MARK CATESBY. *The Auk*, 54, 349–63, 1 pl., 1937.

Important contribution to the life of a great naturalist, based on patient research. "He made two trips to America, one in 1712 and a later one in 1722, and was elected a member of the Royal Society of London in recognition of the publication of his two-volume work 'The Natural History of Carolina, Florida and the Bahama Islands,' which came out in separate numbers between 1731 and 1743." He died in 1749 or 1750. G. S.

[HALES, STEPHEN]. STEPHEN HALES — father of hemodynamics. *Medical Times*, 7 p., illus., Nov. 1944.

D. MEDICAL SCIENCES

Calabresi, Massimo. GIOVANNI MARIA LANCISI and "De subitaneis mortibus." Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 48–54, Baltimore, 1944.

Foster, Finley. WILLIAM HOGARTH and the doctors. *Bulletin of the Medical Library Association*, 32, 356–68, 4 figs., 1944.

Krumbhaar, Edward B.; McDaniel, W. B., 2d. Angina inflammatoria (diphtheria?) as described in DAVID ORME's Edinburgh dissertation (1749) and BENJAMIN MORRIS' Leyden dissertation (1750). Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 103–29, 2 figs., Baltimore, 1944.

E. ALIA

Berkeley, George, Bishop of Cloyne. Philosophical commentaries, generally called the Commonplace Book. An editio diplomatica transcribed and edited with introduction and notes by A. A. LUCE. xlii+486 p. London, Nelson, 1944.

Reviewed by A. D. RITCHIE, *Nature*, 154, 380, 1944.

Ch'ien Chung-shu. China in the English literature of the eighteenth century. *Quarterly Bulletin of Chinese Bibliography*, 2, 7–48, 1941.

XVIIITH CENTURY (*second half*)

A. MATHEMATICS

Connor, Elizabeth. Mme. LEPAUTE, an eighteenth-century computer. Astronomical Society of the Pacific, Leaflet no. 189, 8 p., November, 1944.

Sarton, George. LAGRANGE's personality (1736–1813). *Proceedings of the American Philosophical Society*, 88, 457–96, 15 figs., 1944.

LAGRANGE's biography based exclusively upon contemporary sources. Analysis of his character. Notes on Lagrange MSS in the United States and Paris. Bibliography.

B. PHYSICAL SCIENCES AND TECHNOLOGY

Browne, C. A. THOMAS JEFFERSON and agricultural chemistry. *Scientific Monthly*, 60, 55–62, 1945.

Dickinson, H. W. HENRY CORT's bicentenary. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 31–47, 1943.

Dickinson, H. W.; Vowles, H. P. JAMES WATT and the Industrial Revolution. 59 p., illus. (Science in Britain). London, Longmans Green & Co. [1944].

"The perfection of the steam engine by JAMES WATT profoundly influenced the trend of the Industrial Revolution. The Revolution itself, however, was the direct outcome of social and economic forces which had been gathering strength over a long period. Thus to understand WATT and his work it is necessary to see them in historical perspective. The outline of WATT's career given in this volume is therefore presented not only against the background of the Industrial Revolution, but also in relation to relevant aspects of earlier economic, scientific and technological developments which ultimately led to a transformation in the character of British life and thought."

[FRANKLIN, BENJAMIN]. Meet Dr. Franklin. vi+234 p. Philadelphia, Franklin Institute, 1943.

Reviewed by CARL BECKER, *American Historical Review*, 50, 140–43, 1944.

Koenig, Duane. Telegraphs and telegrams in revolutionary France. *Scientific Monthly*, 59, 431–37, 1944.

A short account of visual telegraphy from its inception in 1793 to the invention of the electric telegraph fifty years later. Illustrations of several types of telegraph instruments are included. C. Z.

Meikle, W. P. Highway repairs in the 18th century. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 123–28, 1943.

Sarton, George. Second preface to volume XXXV. Vindication of Father HELL. *Isis*, 35, 97–105, 1 pl., 8 figs., 1944.

I. Father HELL (1720–92). II. HELL and MESMER. HELL's writings on magnetism. III. Transits of Venus of 1761 and 1769. HELL's writings on those transits. IV. Attacks on Father HELL's integrity. V. Father HELL's rehabilitation.

Appendices. I. The literary expedition to the North Pole. II. Bibliography. III. Father HELL's portrait, 1770.

C. NATURAL SCIENCES

Allen, Elsa G. A third set of John Abbot bird drawings. *The Auk*, 59, 563–71, 1942.

"JOHN ABBOT was employed by the Chetham Library of Manchester between 1791 and 1802, to draw birds and spiders of Carolina and Georgia. At this time ABBOT had been in America some fifteen years and was probably in his mid-thirties."

Griffin, Francis J. The "Archiv der Insectengeschichte" of J. C. FUESSLY. Heft 1–8, 1781–1786. *Journal of the Society for the Bibliography of Natural History*, 1, 83–85, 1937.

Martin, Lawrence. JOHN MITCHELL's map. *Library of Congress, Quarterly Journal of Current Acquisitions*, v. 1, no. 4, 36–38, 1944.

"A map of the British and French North American colonies in the present eastern United States and Canada was published at London in 1755 with title in English. Its author was JOHN MITCHELL, a Virginia physician and botanist. This is the most important map in American history."

[SCHREBER, J. C. D.]. A facsimile of the *Novae species insectorum*, 1759, of J. C. D. SCHREBER. By FRANCIS J. GRIFFIN. *Journal of the Society*

for the Bibliography of Natural History, 1, 221–39, 1939.

Sherborn, C. Davies. DRU DRURY. *Journal of the Society for the Bibliography of Natural History*, 1, 109–11, 1937.

DRU DRURY (1725–1803), naturalist, entomologist.

Stearn, William Thomas. VENTENAT's "Description des plantes . . . de J. M. CELS," "Jardin de la Malmaison" and "Choix des plantes." *Journal of the Society for the Bibliography of Natural History*, 1, 199–201, 1939.

Apropos of the Empress JOSÉPHINE, the artist, PIERRE JOSEPH REDOUTÉ (1761–1841), and the botanists, ETIENNE PIERRE VENTENAT (1757–1808), JACQUES MARTIN CELS (1743–1814). See also the Bonpland article in *Isis*, 34, 388–89. G. S.

Stearn, William Thomas. PRESL's "Reliquiae Haenkeanae." *Journal of the Society for the Bibliography of Natural History*, 1, 153–54, 1938.

THADDAEUS HAENKE, Czech naturalist (born at Kreibitz, 1761; died in Bolivia, 1817). An anecdote concerning him was told in *Isis*, 34, 394. His *Reliquiae . . . seu Descriptiones et icones plantarum quas in America . . . collegit Thaddaeus Haenke* were published at Prague, 2 vols. folio, 1825–35. G. S.

Svedelius, Nils. CARL PETER THUNBERG (1743–1828) on his bicentenary. *Isis*, 35, 128–34, 4 figs., 1944.

D. MEDICAL SCIENCES

Friedman, Reuben. The Emperor's itch. 93 p., 10 illus. New York, Froben Press, 1940.

"Careful consideration of the various factors involved in this complex case leads to the necessary and inevitable conclusion that NAPOLEON did not have scabies, and that the legend concerning his affliction with that disease is purely mythical."

Drake, T. G. H. English caricatures of medical interest, circa 1800. *Ciba symposia*, 6, 1925–32, illus., 1944.

Frank, Johann Peter. The civil administrator — most successful physician. A dissertation written in 1784 and delivered at Göttingen as an inaugural address by JOHANN LUKIANOVITZ DANILEVSKY. Translated from the Latin with an introduction by JEAN CAPTAIN SABINE. *Bulletin of the History of Medicine*, 16, 289–318, 1944.

Major, Ralph H. Don GASPAR CASÁL, FRANÇOIS THIÉRY and pellagra. *Bulletin of the History of Medicine*, 16, 351–61, 2 figs., 1944.

Oliver, Peter. Notes on science, medicine and public health in the United States in the year 1800. *Bulletin of the History of Medicine*, 16, 116–30, 1944.

E. ALIA

Clark, Harry Hayden. THOMAS PAINE: representative selections, with introduction, bibliography, and notes. cli+436 p. (American Writers Series). New York, American Book Company, 1944.

Reviewed by PHILIP DAVIDSON, *American Historical Review*, 50, 143–44, 1944.

Kimball, Fiske. The life portraits of JEFFERSON and their replicas. *Proceedings of the American Philosophical Society*, 88, 497–534, 28 figs., 1944.

Koch, Adrienne. The philosophy of THOMAS JEFFERSON. xiv+208 p. (Number 14 of the Columbia Studies in American Culture.). New York, Columbia University Press, 1943.

Reviewed by GILBERT CHINARD, *American Historical Review*, 49, 739–40, 1944.

Sarton, George. BECCARIA (1738–94). Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 283–308, 13 figs., Baltimore, 1944.

Including brief bibliography of the editions of *Dei delitti e delle pene* in many languages. The author will gladly send a reprint of this paper to members of the HSS in good standing, as long as the supply lasts. G. S.

XIXTH CENTURY (*whole and first half*)

A. MATHEMATICS

[HAMILTON, SIR WILLIAM ROWAN]. HAMILTON's quaternions. *Isis*, 34, 513, 1943.

B. PHYSICAL SCIENCES AND TECHNOLOGY

Baldwin, A. W. MERCER and mercerization. *Endeavour*, 3, 138–43, 149, 6 figs., 1944.

Brockbank, E. M. JOHN DALTON. Some unpublished letters of personal and scientific interest, with additional information about his colour-vision and atomic theories. ii+62 p., 5 pls. (Publications of the University of Manchester, no. 287). Manchester, Manchester University Press, 1944.

Cortés Plà. Las leyes de OHM. Ensayo de historia científica y humana. 45 p. Santa Fe, Argentina, Universidad Nacional del Litoral, 1942.

Reviewed by ARLINDO CAMILO MONTEIRO, *Petrus Nonius*, 5, 200–03, 1944.

[DALTON]. Centenary of DALTON's death. By C. M. LEGGE and D. E. WHEELER. *Nature*, 154, 240, 1944.

Emery, Clark. The background of TENNYSON's "airy navies." *Isis*, 35, 139–47, 1944.

Fox, Dixon Ryan. Dr. ELIPHALET NOTT (1773–1866) — and the American spirit. 24 p., portr. New York, Newcomen Society, American Branch, 1944.

Friend, J. Newton. JOHN DALTON, 1766–1844. *Nature*, 154, 103–05, 2 figs., 1944.

McKie, Douglas. WÖHLER's 'synthetic' urea and the rejection of vitalism: a chemical legend. *Nature*, 153, 608–10, 1944.

1828 WÖHLER obtained urea by transformation, not by synthesis; 1840 BERZELIUS and 1842 GERHARDT emphatically avowed their belief in vitalism; 1845 KOLBE obtained acetic acid by synthesis; 1860 MARCELLIN BERTHELOT effectively rejected vitalism; 1882 HOFMANN spoke of WÖHLER's synthesis of urea and its evangelical effect on contemporaries. C. W. A.

Mendelssohn Bartholdy, P. WÖHLER's work on urea. *Nature*, 154, 150–51, 1944.

With notes by J. KENNER and DOUGLAS MCKIE.

Pirenne, M. H. Rods and cones, and THOMAS YOUNG's theory of colour vision. *Nature*, 154, 741–42, 2 figs., 1944.

Williams, A. N. "What hath God wrought!" — May 24, 1844. 20 p., illus., New York, Newcomen Society, American Branch, 1944.

Apropos of the first telegraphic message sent by S. F. B. MORSE in 1844.

Winter, H. J. J. The reception of OHM's electrical researches by his contemporaries. *Philosophical Magazine*, 35, 371–86, 1944.

Winter, H. J. J. The significance of the Bakerian lecture of 1843. *Philosophical Magazine*, 34, 700–11, 4 figs., 1943.

C. NATURAL SCIENCES

Beltrán, Enrique. FÉLIX DUJARDIN y su "Histoire naturelle des zoophytes. Infusoires," 1841. *Revista de la Sociedad Mexicana de Historia Natural*, 2, 221–32, 1941.

Geiser, Samuel W. BENJAMIN TAYLOR KAVANAUGH, and the discovery of East Texas oil. *Field & Laboratory*, 12, 46–55, 1944.

Geiser, Samuel W. FRANCIS MOORE, JR. (1808–64), early state geologist of Texas. *Southwestern Historical Quarterly*, 47, 419–25, 1944.

Geiser, Samuel W. *Racer's* Storm (1837), with notes on other Texas hurricanes in the period 1818–1886. *Field & Laboratory*, 12, 59–67, 1944.

[Hübner, Jacob]. A facsimile of the *Lepidopterologische Zuträge*, 1820, of JACOB HÜBNER. By FRANCIS J. GRIFFIN, *Journal of the Society for the Bibliography of Natural History*, 1, 159–92, 1938.

[Lamarck]. The Lamarck manuscripts at Harvard. Edited by WILLIAM MORTON WHEELER and THOMAS BARBOUR. xxxi+202 p., 4 pls. Cambridge, Mass., Harvard University Press, 1933 ($2.50).

"This volume contains a transcript of the original French text and an English translation of the six manuscripts of LAMARCK in the library of the Museum of Comparative Zoology at Harvard University. The first manuscript, a lecture on GALL's conception of the human brain, is of unusual interest because so little is known concerning LAMARCK's medical education. The sixth manuscript contains an account of an eighteenth century botanical excursion. A few of the drawings which accompany the text of one of the manuscripts are reproduced; and a general account of the various manuscripts, with CROOKSHANK's comparison of the life-plans of LAMARCK and DARWIN, is given in the Introduction."

Townsend, A. C. Bibliographical note on C. S. RAFINESQUE. *Journal of the Society for the Bibliography of Natural History*, 1, 471–76, 1943.

Waller, A. E. Dr. SAMUEL P. HILDRETH (1783–1863). *Ohio State Archeological and Historical Society Quarterly*, 53, 313–38, 1944.

A biography of the physician who made such valuable contributions to the geology of Ohio. C. Z.

Wilson, J. Walter. Cellular tissue and the dawn of the cell theory. *Isis*, 35, 168–73, 1944.

D. MEDICAL SCIENCES

Anderson, Fanny J. Medical practices in Detroit during the War of 1812. *Bulletin of the History of Medicine*, 16, 261–75, 1944.

Beltran, Juan Ramon. ROSAS y el Instituto Jenneriano. *Revista Argentina de Historia de la Medicina*, v. 3, no. 3, 19–23, 1944.

Berthold, Arnold Adolph. The transplantation of testes. Translated by D. P. QUIRING. *Bulletin of the History of Medicine*, 16, 399–401, 1944.

Translation of a paper published in German in 1849.

Galdston, Iago. Jean Antoine François Ozanam, 1773–1837. Soldier, physician, epidemiologist, follower of Hippocrates and Sydenham in the development of the concept of the epidemic constitution. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 89–102, Baltimore, 1944.

Major, Ralph H. Agostino Bassi and the parasitic theory of disease. *Bulletin of the History of Medicine*, 16, 97–107, 3 figs., 1944.

Maluf, N. S. R. Carson, Ludwig, and Donders and the negative interpleural pressure. *Bulletin of the History of Medicine*, 16, 417–18, 2 portr., 1944.

Miller, Genevieve. Directions for the use of an early American marine medicine chest. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 217–22, Baltimore, 1944.

Paz Soldán, Carlos Enrique. Medidas de seguridad contra la fiebre amarilla durante el virreynato del Perú. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 260–66, Baltimore, 1944.

Sarton, George. Query no. 107. Jacob Sala of Somerset, 1813? *Isis*, 35, 177–78, 1 fig., 1944.

Saussure, Raymond de. Frédéric Bérard, historien de la médecine. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 309–17, Baltimore, 1944.

Frédéric Bérard was born in Montpellier, 1789. Discussion of his main work, *Doctrine Médicale de l'Ecole de Montpellier et Comparaison de ses Principes avec ceux des autres Ecoles d'Europe* (Montpellier 1819). G. S.

Zakon, S. J.; Benedek, T. David Gruby and the centenary of medical mycology, 1841–1941. *Bulletin of the History of Medicine*, 16, 155–68, portr., 1944.

E. Alia

Browne, C. A. Alexander von Humboldt as historian of science in Latin America. *Isis*, 35, 134–39, 1944.

Geiser, Samuel W. David Gouverneur Burnet [1788–1870], satirist. *Southwestern Historical Quarterly*, 48, 33–37, 1944.

[Mill, John Stuart]. *Isis*, 35, 179, 1944.

Apropos of a plan to edit his correspondence.

Richards, Elizabeth M. Alexandre Vattemare and his system of international exchanges. *Bulletin of the Medical Library Association*, 32, 413–48, 1944.

XIXth CENTURY (*second half*)

B. Physical Sciences and Technology

Beltrán, Enrique. El centenario de una gran figura en la historia de la microscopia Ernst Abbe, 1840–1905. *Revista de la Sociedad Mexicana de Historia Natural*, 1, 279–84, 1940.

O'Neill, John J. Prodigal genius. The life of Nikola Tesla. 326 p. New York, Washburn, 1944.

Reviewed by M. M., *More Books*, 19, 407, Boston, 1944.

Randell, W. L. S. Z. de Ferranti. 29 p., illus. London, British Council, 1943.

Sebastian Ziani de Ferranti was born in Liverpool, 1864; he died in Zürich, in 1930. He was one of the pioneers in the generation and distribution of high potential electrical currents. G. S.

Rayleigh, Lord. The Life of Sir J. J. Thomson, O.M. [1856–1940], Sometime Master of Trinity College, Cambridge. x+299 p. Cambridge University Press; New York, The Macmillan Co., 1942 (reprinted 1943).

This excellent and satisfying biography is the second to come to us from the present Lord Rayleigh's pen, the first being an account of his father (London 1924). This book is based, to a large extent, upon Sir J. J. Thomson's own book: *Recollections and Reflections* (London, G. Bell and Sons, Ltd., 1936). But, as the writer declares in the preface: "Some points which were prominent to outside observers were naturally omitted from his own book on grounds of modesty. Again, the account of his most important investigations, though admirable, is somewhat in the textbook style, and hardly gives much insight into the perplexities and technical difficulties which had to be overcome. Nor does it show in sufficient detail the complicated interactions between his own work and the work of his pupils, many of whom were men of power and originality, and started investigations which converged in a remarkable way on the final results attained by the School under his guidance." These omissions are amply restored in the present biography. It is a fine portrayal of the rich and humane character of the man and, at the same time, a most excellent account of his achievement in relation to the work of his predecessors, his contemporaries, and his students. There are two appendices: a list of distinctions and a supplement to the bibliography which was given in the writer's own notice of him in *Obituary notices of Fellows of the Royal Society*, 1941. The book is done most carefully; this reviewer noted but one misprint, *i.e.*, p. 288, 1923, read University of Pennsylvania for Philadelphia University. I. B. C.

C. Natural Sciences

[Beddome, R. H.]. A facsimile of R. H. Beddome's articles on Indian reptiles, 1862–1870. By Malcolm Smith. *Journal of the Society for the Bibliography of Natural History*, 1, 273–334, 1940.

Beltrán, Enrique. Datos y documentos para la historia de las ciencias naturales en México. I. Los estatutos de la primitiva Sociedad Mexicana de Historia Natural. *Revista de la Sociedad Mexicana de Historia Natural*, 4, 115–21, facs., 1943.

Beltrán, Enrique. Maynard M. Metcalf [1868–1940], su obra científica y el conocimiento de los protociliados. *Revista de la Sociedad Mexicana de Historia Natural*, 1, 265–78, port., 1940.

Beltrán, Enrique. La "Gaceta Médica de México" 1865–1941, y sus aportaciones al conocimiento de la zoología. *Gaceta Médica de México*, 72, 580–90, 1942.

Bond, T. E. T. Robert Wight (1796–1872), Dr. Freke and the "Origin of species." *Nature*, 154, 566–69, 1944.

Foà, Carlo. O museu de psiquiatria e de antropologia criminal organizado por Cesare Lombroso. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 62–64, Baltimore, 1944.

Geiser, Samuel W. John Solomon Rarey (1827–66). *Southwestern Historical Quarterly*, 48, 105–07, 1944.

Geiser, Samuel W. Professor Jacob Boll and the natural history of the Southwest. 14 p., portr. *American Midland Naturalist*, 11, March, 1929.

Jacob Boll, Swiss botanist, born in the canton Aargau in 1828, came to America in 1869, investigated the natural history of Texas, died during a field trip in Wilbarger County, Texas, 1880. G. S.

Ralston, H. J. G. J. Romanes on the excitability of muscle. *Science*, 100, 123–24, 1944.

D. Medical Sciences

Ackerknecht, Erwin H. Paul Bert's triumph. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 16–31, Baltimore, 1944.

Apropos of the English translation of Paul Bert's *Pression barométrique*, 1878 (*Isis*, 35, 35).

Bernard, Claude. Introducción al estudio de la medicina experimental. 309 p. Buenos Aires, Editorial Losada, 1944.

Reviewed by Aldo Mieli, *Minerva*, 1, 181–82, Buenos Aires, 1944. According to Mieli's review this is the fourth Spanish translation of Bernard's *Introduction*, the first being by Antonio Espina y Cabo (Madrid 1880), the second by Carlos García (San Luis de Potosí, Mexico 1900), the third by José Joaquín Izquierdo (Mexico 1942). This new translation is by Nydia Lamarque. Izquierdo's translation has an excellent introduction, this one none. G. S.

Brill, A. A. Freud's contribution to psychiatry. 244 p. New York, Norton, 1944 ($2.75).

Almost from the very commencement of its birth, Dr. A. A. Brill has been associated with the psychoanalytic movement in psychiatry. In this book, originally written and delivered as The Thomas William Salmon Memorial Lectures at the New York Academy of Medicine, Dr. Brill tells the story of the growth and development of psychoanalysis in terms of his own experience and his association with the leaders in that field. The book will be very helpful reading to students of psychoanalysis, and, indeed, to all who may be interested in the subject. The analyses of Freud's individual contributions will be particularly helpful, and certainly the future historian of the subject will find here much unique material. Dr. Brill deserves the thanks of all Americans for his pioneer work in the field of interpreting Freud in this country. M. F. A. M.

Butler, Byron C. John Shrady's "Harsen prize," 1861. *Bulletin of the History of Medicine*, 16, 131–53, 9 figs., 1944.

Draeger, Ida J. Women as physicians in the United States, 1850–1900. A list of the publications issued during the period which are found in the Library of the Woman's Medical College of Pennsylvania. *Bulletin of the History of Medicine*, 16, 72–81, 1944.

Halstead, Frank G. The war years of Albert James Myer, M.D.: Army Signal Service, 1861–1863. *Bulletin of the History of Medicine*, 16, 43–63, 1944.

Kleinschmidt, Earl E. Prevention and control of communicable diseases in early Michigan. *Bulletin of the History of Medicine*, 16, 13–42, 1944.

Magnus-Levy, Adolf. The heroic age of German medicine. *Bulletin of the History of Medicine*, 16, 331–42, 1944.

Oberndorf, Clarence P. The psychiatric novels of Oliver Wendell Holmes. 268 p. New York, Columbia University Press, 1943. 2nd printing, 1944.

Reviewed by L. J. KARNOSH, *Bulletin of the Medical Library Association*, 32, 402–04, 1944.

Postell, William Dosité. A Cesarean section with three claimants. *Bulletin of the History of Medicine*, 16, 65–71, 1 facs., 1944.

Sanes, Samuel. ELIZABETH BLACKWELL: her first medical publication. *Bulletin of the History of Medicine*, 16, 83–88, 1 facs., 1944.

Schneck, Jerome M. A bibliographical note on STERNBERG. *Bulletin of the History of Medicine*, 16, 414–16, 1944.

"GEORGE MILLER STERNBERG (1838–1915), a former Surgeon-General of the United States Army (1893–1902) and referred to by ROBERT KOCH as the father of American bacteriology, was the author of the first American textbook of bacteriology. The only biography of STERNBERG ever prepared was written by his wife."

E. Alia

Guerlac, Henry. GEORGE LINCOLN BURR. *Isis*, 35, 147–52, 1 pl., 1944.

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XXth CENTURY

A. Mathematics

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Portrait and bibliography.

B. Physical Sciences and Technology

BRAGG, WILLIAM HENRY (1862–1942). Obituary by E. N. DA C. ANDRADE. *Obituary Notices of Fellows of the Royal Society*, 4, 277–300, 1943.

Portrait and bibliography.

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Reviewed by ERIC K. RIDEAL, *Nature*, 154, 656, 1944. Festschrift for his sixtieth birthday.

C. Natural Sciences

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Portrait and bibliography.

HERON-ALLEN, EDWARD (1861–1943). Obituary by R. A. GREGORY. *Obituary Notices of Fellows of the Royal Society*, 4, 447–54, portr., 1943.
Actor, archaeologist, bibliographer, biographer, circus-rider, folklorist, geologist, horticulturist, journalist, novelist, orientalist, palaeontologist, parapsychologist, protozoologist, solicitor, versifier and violin-maker.
C. W. A.

MIERS, HENRY ALEXANDER (1858–1942). Obituary by T. H. HOLLAND. *Obituary Notices of Fellows of the Royal Society*, 4, 369–80, 1943.
Portrait and bibliography.

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D. MEDICAL SCIENCES

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Reviewed by J. B. DE C. M. SAUNDERS, *Isis*, 35, 188, 1944.

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E. ALIA

Boyce, Gray Cowan. The legacy of HENRI PIRENNE. *Byzantion*, 15, 449–64, 1941.

Montagu, M. F. Ashley. ALEŠ HRDLIČKA, 1869–1943. *American Anthropologist*, 46, 113–17, pl., 1944.

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Apropos of *Mein Kampf*.

Science in Soviet Russia. Papers presented at Congress of American-Soviet Friendship, New York City, November 7, 1943. Under the auspices of the National Council of American-Soviet Friendship. ix+97 p. Lancaster, Pa., Jaques Cattell Press, 1944 ($1.50).
"The papers in this volume constitute the proceedings of the Science Panel of the Congress of American-Soviet Friendship held in New York City on November 7, 1943. This Congress commemorated ten years of diplomatic relations between the U.S.A. and the U.S.S.R. Professor HAROLD C. UREY was the chairman of the 'Soviet Science and Technology' portion of the panel, and Professor WALTER B. CANNON was the chairman of the 'Public Health and Wartime Medicine in the U.S.S.R.' portion of the panel. The latter was arranged with the cooperation of the American-Soviet Medical Society."

PART II
HISTORICAL AND ETHNOGRAPHICAL CLASSIFICATION

I. ANTIQUITY

2. EGYPT

Borchardt, Ludwig. Die Messung des Sonnendurchmessers im astronomischen Papyrus von Oslo. *Symbolae Osloenses*, 14, 73–76, 1935.
Apropos of the papyrus edited by S. EITREM in *Aegyptus*, 13, 479–86, 1933. According to BORCHARDT, the method must be Alexandrian. G. S.

Free, Joseph P. Abraham's camels. *Journal of Near Eastern Studies*, 3, 187–93, 1944.

"Students of the Old Testament have often questioned the accuracy of the statement in Gen. 12:16 which records that, while in Egypt, ABRAHAM had camels in his possession. This is the first reference to camels in the Old Testament, and it implies their presence in Egypt at an early date." The author concludes that while camels did not come into general use in Egypt until the Greco-Roman periods, they were known before. G. S.

Hanotaux, Gabriel (1853–1944). Histoire de la nation égyptienne. 6 vols. Paris, 1931–36.

This elaborate history of Egypt, richly illustrated, is divided into seven volumes of which the first is introductory. That first volume contains a historical introduction by the editor of the series, HANOTAUX, and a geographical one by CHARLES DE LA RONCIÈRE. The geographical introduction is divided into two parts, Physical geography (geology, the Nile) and Historical geography (the capitals, Greek cities, frontiers, maritime roads, nomes, Christian and Muslim Egypt). Pharaonic Egypt is dealt with by ALEXANDRE MORET; the Alexandrine period to the Muslim conquest, by PIERRE JOUGUET, CH. DIEHL, VICTOR CHAPOT; the Arabic period (622–1517), by GASTON WIET; the Turkish one and the French expedition, by HENRI DEHÉRAIN; Modern Egypt (2 vols.), by HANOTAUX, CHARLES ROUX, DEHÉRAIN, RENÉ LABRUYÈRE. I have not seen vol. 7 and do not know whether it has been published.

These volumes written by specialists are valuable, but their value is much decreased by the lack of references and indices; the abundant illustrations are very insufficiently described. The result is neither here nor there; it is too learned for the general reader and disappointing to the scholar, who is not willing to accept the dicta of his French colleagues, however distinguished, without proper documentation. G. S.

Heegaard, Poul. Three horoscopes in the Oslo collection of papyri. *Symbolae Osloenses*, 15/16, 98–100, 1936.

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Neugebauer, Otto. Zum astronomischen Papyrusfragment Pap. Osl. 73. *Symbolae Osloenses*, 17, 49–53, 1937.

Pieper, Max. Zum astronomischen Papyrus von Oslo. *Symbolae Osloenses*, 13, 65–67, 1934.

Apropos of the papyrus edited by S. EITREM in *Aegyptus*, 13, 479–86, 1933.

Winlock, H. E. Excavations at Deir el Bahri: 1911–1931. x+235 p., 96 pls. New York, Macmillan, 1942.

Reviewed by CARLTON T. HODGE, *Journal of the American Oriental Society*, 64, 92, 1944.

Yahuda, A. S. The Osiris cult and the designation of Osiris idols in the Bible. *Journal of Near Eastern Studies*, 3, 194–97, 1944.

The author claims that the curious word *gillūlīm* (translated idols) which occurs 48 times in OT refers to the Osiris cult. G. S.

3. BABYLONIA AND ASSYRIA

Cameron, George G. The Babylonian scientist and his Hebrew colleague. *Biblical Archaeologist*, 7, 21–29, 32–40, 9 figs., 1944.

Denton, George B. A new interpretation of a well-known Assyrian letter. *Journal of Near Eastern Studies*, 2, 314–15, 1943.

"Harper letter no. 586 has generally been interpreted as giving a diagnosis of systemic infection due to the teeth and as prescribing extraction of the teeth as the treatment. WATERMAN's translation of the essential part — in which other translators have substantially agreed — is as follows: 'The burning of his head, his hands (and) his feet wherewith he burns is because of his teeth. His teeth should be drawn.' Both the diagnosis and the prescription, as translated here, are worth discussion."

Dubberstein, Waldo H. Assyrian-Babylonian chronology (669–612 B.C.). *Journal of Near Eastern Studies*, 3, 38–42, 1944.

Goetze, Albrecht. Additions to PARKER and DUBBERSTEIN's Babylonian chronology. *Journal of Near Eastern Studies*, 3, 43–46, 1944.

Kramer, S. N. The epic of Gilgamesh and its Sumerian sources. A study in literary evolution. *Journal of the American Oriental Society*, 64, 7–23, 83, 1944.

Lewy, Hildegard. Assyro-Babylonian and Israelite measures of capacity and rates of seeding. *Journal of the American Oriental Society*, 64, 65–73, 1944.

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Sachs, A. J. Some metrological problems in old-Babylonian mathematical texts. *Bulletin of the American Schools of Oriental Research*, no. 96, 29–39, 1944.

Segrè, Angelo. Babylonian, Assyrian and Persian measures. *Journal of the American Oriental Society*, 64, 73–81, 1944.

4. Greece

Eitrem, S. Die magischen Gemmen und ihre Weihe. *Symbolae Osloenses*, 19, 57–85, 6 figs., 1939.

Lagercrantz, Otto. Ein alchemistisches Rezept. *Symbolae Osloenses*, 14, 1–5, 1935.

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Wunderlich, Silvia A. Greek art and Greek medicine. *Bulletin of the Medical Library Association*, 32, 324–31, 3 figs., 1944.

5. Rome

Berthier, André. Les vestiges du christianisme antique dans la Numidie centrale. Avec la collaboration de F. Logeart, et M. Martin. 233 p., 30 pls., figs. (Gouvernement général de l'Algérie, Direction des Antiquités, Missions Archéologiques). Imprimerie Polyglotte Africaine, Maison-Carrée, Alger (n.d., 1942?).

The author's avant-propos is dated Constantine, le 11 février 1942. The book is based upon eight years of excavation and literary research; it includes an elaborate bibliography but no index, except a list of places. Conclusion: "Le christianisme rural, dont nous venons d'étudier les vestiges, est surtout caractérisé par le grand nombre des sanctuaires, basiliques ou simples chapelles, qui renferment tous une abondance de reliques. Il apparait donc dominé par le culte des saints." . . . "Entre les saints donatistes et les marabouts actuels, il y a plus d'un caractère de parenté: fait d'avoir été élus par la voix du peuple, facilité avec laquelle on leur rend un culte après leur mort, caractère local de la vénération qu'on leur porte, extension de la sainteté à tout ce qui les environne et anonymat du plus grand nombre d'entre eux. Ces remarques peuvent aider à établir un inventaire plus précis des vestiges archéologiques du donatisme et contribuer à montrer que le culte des saints, témoin de l'anthropolâtrie foncière de l'âme berbère, a été d'une pratique constante en Afrique du Nord, où il existe dès les temps les plus reculés, pour se poursuivre jusqu'à notre époque, avec une remarquable fixité." G. S.

Durant, Will. Caesar and Christ. A history of Roman civilization and of Christianity from their beginnings to A.D. 325. The Story of Civilization. xvi+751 p., 39 figs., maps. New York, Simon and Schuster, 1944.

This is the third volume of the author's Story of Civilization, the first two being *Our Oriental Heritage* (1935) and *The Life of Greece* (1939). Such volumes defy analysis and it would not be fair to criticize them from any special point of view. They are to be taken as a whole, syntheses based upon wide and intelligent reading. Historians of science will note with pleasure that their field has not been neglected. There are chapters on Roman husbandry, industry, medicine, and such men as Lucretius, Cicero, Vitruvius, Celsus, Seneca, Pliny the Elder, are discussed. There is perhaps far too much for the "general" reader and too little for the learned one, but that seems unavoidable in any book built on this scale. The thoughtful reader will get out of it as much as he deserves. G. S.

II. MIDDLE AGES

6. Middle Ages (*generalities*)

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Baisier, Léon. The lapidaire Chrétien, its composition, its influence, its sources. vii+130 p. Catholic University of America, 1936.

Reviewed by Helen Robbins Bittermann, *Speculum*, 12, 111–14, 1937.

Bennett, Henry Stanley. Life on the English manor. A study of peasant conditions 1150–1400. xviii+364 p., 6 pls. Cambridge, University Press, 1937.

Besseler, Heinrich. Die Musik des Mittelalters und der Renaissance. (In 10 Heften). 338 p., figs., pls. (Handbuch d. Musik-Wissenschaft., Lief. 44, 49, 60, 69, 73, 77, 78, 79, 80, 81). Wildpark-Potsdam, Akad. Verlagsges. Athenaion, 1931–34.

Bolton, Charles Knowles. Terra nova: the northeast coast of America before 1602: Annals of Vinland, Markland, Estotiland, Drogeo, Baccalaos, and Norumbega. xiii+194 p., maps, ills. (Useful reference ser., 56). Boston, Faxon, 1935.

Reviewed by Halldór Hermannsson, *Geographical Review*, 26, 347, 1936.

Brittain, Fred. The medieval Latin and Romance lyric to A.D. 1300. xiii+274 p. Cambridge, University Press, 1937.

Reviewed by G. H. Gerould, *Speculum*, 13, 465, 1938.

Browe, Peter (S.J.). Beiträge zur Sexualethik des Mittelalters. 143 p. (Breslauer Studien zur historischen Theologie Bd. 23). Breslau, Müller & Seiffert, 1932.

Brunner, Karl (editor). The seven sages of Rome (southern version). Edited from the MSS. xxxi+233 p. (Early English Text Society, 191). Oxford, University Press, 1933.

Cahen, Claude. La Syrie du Nord à l'époque des croisades et la principauté franque d'Antioche. vii+768 p. Paris, Geuthner, 1940.

Reviewed by JOHN L. LAMONTE, *American Historical Review*, 50, 111–12, 1944.

Calmette, Joseph. Le monde féodal. lii+490 p. (Clio: Introduction aux études historiques, 4). Paris, Les Presses Universitaires de France, 1934. Nouvelle ed., 1937.

Campbell, George Archibald. The Knights Templars: their rise and fall. 356 p., ill., maps. London, Duckworth, 1937.

Carlyle, Robert Warrand; Carlyle, A. J. A history of mediaeval political theory in the West. 6 vols. Edinburgh, Blackwood, 1903–36.

Coville, Alfred. Recherches sur quelques écrivains du XIVe et du XVe siècle. Deux canonistes: SIMON DE BROSSANO et GILLES BELLEMÈRE. L'autuer des XV joies du mariage. JACQUES DE NOUVION. Sur un conte de NICOLAS DE CLAMANGES. Poésies latines et lettres inédites de NICOLAS DE CLAMANGES. 340 p. Paris, Droz, 1935.

Reviewed by GEORGES DOUTREPONT, *Journal des Savants*, 127–34, 1936.

De Roover, Raymond. Early accounting problems of foreign exchange. *The Accounting Review*, 19, 381–407, 1944.

In this article and in another, "What is dry exchange?" (*Journal of Political Economy*, 52, 250–66, 1944), the author tries to show "that bills of exchange were *not discounted* in the Middle Ages and early modern period, as many authors state and believe, but that they were bought and sold at a price which varied up and down with the exchange rate. Of course, interest was included in the rate of exchange and the presence of the time factor shows up after careful analysis of the structure of the money market. Bills of exchange were always foreign bills, never domestic bills, and involved a credit as well as an exchange transaction. Lenders bought bills from borrowers who sold them."

Deschamps, Paul. Le Crac des Chevaliers: étude historique et archéologique. 2 vols. Paris, Geuthner, 1934.

Dick, Friedrich. Bezeichnungen für Saiten- und Schlaginstrumente in der altfranzösischen Literatur. 147 p. (Giessener Beiträge z. roman. Philol., H. 25). Giessen, 1932.

Eck, Alexandre. Le moyen âge russe. Préface de HENRI PIRENNE. 569 p. (Institut de philologie et d'hist. orientales de l'Université libre de Bruxelles). Paris, Maison du Livre Etranger, 1933.

Reviewed by SAMUEL H. CROSS, *American Historical Review*, 40, 486–89, 1935; by GEORGE VERNADSKY, *Speculum*, 10, 208–09, 1935.

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Reviewed by DINO BIGONGIARI, *American Historical Review*, 41, 521–22, 1936.

Flower, Robin. Ireland and medieval Europe. The Sir John Rhys Memorial Lecture. *Proceedings of the British Academy*, 13, 1927, 271–303, London, 1930.

Foakes-Jackson, Frederick John. The church in the Middle Ages. x+154 p. Cambridge, University Press, 1934.

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Gilson, Etienne. The spirit of mediaeval philosophy. Translated by A. H. C. DOWNES. ix+490 p. (Gifford lectures 1931–1932). New York, Scribner's, 1936.

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Grabmann, Martin. Studien über den Einfluss der aristotelischen Philosophie auf die mittelalterlichen Theorien über das Verhältnis von Kirche und Staat. 161 p. (Sitzungsber. d. Bayer. Akad. d. Wiss., Philos.-hist. Abtg., 2). München, Beck, 1934.

Grousset, René. Histoire des Croisades et du Royaume franc de Jérusalem. 3 vols. Paris, Plon, 1934–36.

Heimsoeth, Heinz. Die sechs grossen Themen der abendländischen Metaphysik und der Ausgang des Mittelalters. 2. Aufl. vii+310 p. Berlin, Junker & Dünnhaupt, 1934.

Henel, Heinrich. Studien zum altenglischen Computus. ix+95 p. (Beiträge z. engl. Philol. Hg. v. M. Förster, 26. H.). Leipzig, Tauchnitz, 1934.

Hermannsson, Halldór. Icelandic illuminated manuscripts of the Middle Ages. 32 p., 80 pls.

(Corpus codicum islandicorum medii aevi, 7). Copenhagen, Levin & Munksgaard, 1935.

Reviewed by RICHARD BECK, *Speculum*, 11, 138–39, 1936.

Hermannsson, Halldór. Old Icelandic literature. A bibliographical essay. 50 p. (Islandica, 23). Ithaca, N. Y., Cornell University Press, 1933.

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Hildburgh, Walter Leo. Medieval Spanish enamels and their relation to the origin and development of copper champlevé enamels of the twelfth and thirteenth centuries. xiv+146 p. Oxford University Press, 1936.

Holmes, Urban Tigner, Jr. A history of old French literature from the origins to 1300. xii+351 p. Chapel Hill, N. C., Linker, 1937.

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Homo, Léon. Rome médiévale, 476–1420. Histoire, civilisation, vestiges. 327 p. Paris, Payot, 1934.

Reviewed by A. MERLIN, *Journal des savants*, 153–64, 1935.

Hopkin-James, Lemuel John (editor). The Celtic gospels, their story and their text. Oxford University Press, 1934.

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Reviewed by E. HOEPFFNER, *Journal des savants*, 75–86, 1937.

La Monte, John L. The significance of the crusaders' states in medieval history. *Byzantion*, 15, 300–15, 1941.

"Many of the beneficial effects of the crusades on Europe came not through the crusades themselves but rather through the orientalized, tolerant Franks of Syria in the intervals of peace between crusades. If the art forms of Jerusalem may be considered the inspiration of Renaissance art, the tolerance and worldliness of the crusaders' states can be equally well considered the source of the secularization of society and the emphasis on the worldly aspects of life which characterized the age of the despots as distinguished from the age of faith. Although their political institutions were those of the eleventh century in the West, their intellectual and economic civilization had progressed beyond that of their contemporary European neighbors. They had learned from the East and from mingling with men of a different race and religion a breadth of view and a tolerance which Europe was not to learn for many years. In politics reactionaries, in the amenities of civilization the crusader states were far in advance of their times."

Larson, Laurence M. The earliest Norwegian laws. Being the Gulathing law and the Frostathing law. Translated from the old Norwegian. New York, Columbia University Press, 1935.

Lechner, Joseph. Die spätmittelalterliche Handschriftengeschichte der Benediktinerinnenabtei St. Walburg, Eichstätt (Bayern). vi+103 p., 1 pl. (Eichstätter Studien, 2). Münster i. W., Aschendorff, 1937.

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MacKinney, Loren C. *Oleum Savininum:* an early medieval synthesis of medical prescriptions. *Bulletin of the History of Medicine*, 16, 276–88, 2 pls., 1944.

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Mellone, Sydney Herbert. Western Christian thought in the Middle Ages. An essay in interpretation. viii+304 p. London, Blackwood, 1935.

Neilson, Nellie. Medieval agrarian economy. vi+106 p. (Berkshire Studies in European History). New York, Holt, 1936.

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Reviewed by HALLDÓR HERMANNSSON, *American Historical Review*, 43, 591–93, 1938.

Ogilvy, Jack David Angus. Books known to Anglo-Latin writers from ALDHELM to ALCUIN (670–804). (The Mediaeval Academy of America, Studies and Documents, no. 2). xix+108 p. Cambridge, Mass., Mediaeval Academy of America, 1936.

Reviewed by M. L. W. LAISTNER, *Speculum*, 12, 127–29, 1937.

Oppermann, Charles James August. The English missionaries in Sweden and Finland. xxii+221 p. New York, Macmillan, 1937.

Perdrizet, Paul. Le calendrier de la nation d'Allemagne de l'ancienne Université de Paris. xiv+120 p., 20 pls. (Publication de la Faculté des Lettres de l'Université de Strasbourg). Paris, Les Belles-Lettres, 1937.

Reviewed by A. DE LABORDE, *Journal des savants*, 89–90, 1938.

Perdrizet, Paul. La calendrier parisien à la fin du moyen âge. D'après le bréviaire et les livres d'heures. 314 p., 31 ills. (Publication de la Faculté des Lettres de l'Université de Strasbourg). Paris, Les Belles-Lettres, 1933.

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Powicke, Frederick Maurice. The Christian life in the Middle Ages and other essays. viii+176 p. Oxford, Clarendon Press, 1935.

Raby, Frederic James E. A history of secular Latin poetry in the Middle Ages. 2 vols., xii+408 p.; vii+388 p. Oxford, Clarendon Press, 1934.

Reviewed by E. K. RAND, *Speculum*, 10, 222–23, 1935.

Rashdall, Hastings (1858–1924). The universities of Europe in the Middle Ages. New edition in three volumes, ed. F. M. POWICKE and A. B. EMDEN. xliv+593 p., 1 pl.; ix+342 p.; xxvi+588 p., 1 pl. Oxford, Clarendon Press, 1936.

Reviewed by GAINES POST, *Speculum*, 12, 129–35, 1937 and by GRAY C. BOYCE, *American Historical Review*, 42, 725–28, 1937.

Reichborn-Kjennerud, I. Fragmente ärztlicher Texte in mittelalterlichen Gesetzbüchern Norwegens. *Symbolae Osloenses*, 15/16, 163–72, 4 figs., 1936.

Richards, John F. C. A new manuscript of a Rithmomachia. *Scripta Mathematica*, 9, 169–83, 256–64, 1 fig., 1943.

Riesman, David. The story of medicine in the Middle Ages. xii+402 p., 79 ills. New York, Hoeber, 1935.

Roques, Mario. Recueil général des lexiques français du moyen âge (XIIe–XVe siècle). (Bibliothèque de l'Ecole des Hautes Etudes, fasc. 264). Paris, Champion, 1936–38.

Salter, Herbert Edward. Medieval Oxford. 160 p. (Oxford Historical Society). New York, Oxford University Press, 1936.

Reviewed by B. H. PUTNAM, *American Historical Review*, 43, 100–01, 1937.

Schlauch, Margaret. Romance in Iceland. 201 p. Princeton, University Press, 1934.

Reviewed by F. P. MAGOUN, JR., *Speculum*, 11, 151–53, 1936. "Romance in Iceland is an able pioneer study of the Icelandic lygisögur, fictitious or imaginary (vs. historical and heroic) stories, drawn, as Dr. SCHLAUCH makes abundantly clear, from all the world and illustrating the wide contacts enjoyed by the Icelanders in the period from ca. 1200 to 1500."

Schwerin, Claudius Freih. v. (translator). Schwedische Rechte, Älteres Westgötalag, Uplandslag. xiii+256 p. (Germanenrechte. Texte und Übersetzungen, 7). (Schriften d. Akad. f. Dtsch. Recht. Gruppe Rechtsgesch.). Weimar, Böhlaus, 1935.

Simpson, William Douglas. The Celtic Church in Scotland: a study of its penetration lines and art relationships. Aberdeen University Press, 1935.

Singer, Charles. Magic and medicine in early England. Fison memorial lecture delivered at Guy's Hospital Medical School, on June 18, 1936.

Reviewed in *Nature*, 137, 1081, 1936.

Tribalet, Jacques. Histoire médicale de Chartres jusqu'au XIIe siècle. Sur un texte inédit chartrain du Xe siècle "Horus isagoge Sorani." 154 p. Paris, Vigot, 1936.

Reviewed by PIERRE BRUNET, *Archeion*, 19, 268–73, 1937.

Wilmart, André. Auteurs spirituels et textes dévots du moyen âge. 626 p. (Etudes d'histoire littéraire). Paris, Bloud et Gay, 1932.

Reviewed by G. La Piana, *Speculum*, 11, 156–60, 1936.

Wirtgen, Bernhard. Die Handschriften des Klosters St. Peter und Paul zu Erfurt bis zum Ende des 13. Jahrhunderts. 139 p. Leipzig, Harrassowitz, 1936.

7. Byzantium

Bruns, Gerda. Der Obelisk und seine Basis auf dem Hippodrom zu Konstantinopel. Mit einem Beitrag von Friedrich Krauss. viii+92 p., 89 figs. (Istanbuler Forschungen, hrsg. v. d. Abt. Istanbul des archäol. Institutes des Deutschen Reiches, 7). Istanbul, Deutches archäol. Institut, 1935.

Demus, Otto. Die Mosaiken von San Marco in Venedig 1100–1300. 108 p., 50 figs. Baden b. Wien, Rohrer, 1935.

Grégoire, Henri. Notes on the Byzantine epic. The Greek folk-songs and their importance for the classification of the Russian version and of the Greek manuscripts. *Byzantion*, 15, 92–103, 1941.

Höeg, Carsten. La notation ekphonétique. 162 p., 3 pls. (Monumenta musicae Byzantinae, 1, fasc. 2). Copenhagen, Levin & Munksgaard, 1935.

Reviewed by Helen Robbins Bittermann, *Speculum*, 11, 148–50, 1936.

Hussey, Joan Mervyn. Church and learning in the Byzantine Empire 867–1185. xiv+259 p. London, Oxford University Press, 1937.

Reviewed by A. Vasiliev, *Speculum*, 12, 524–25, 1937 and by Robert P. Blake, *American Historical Review*, 43, 355–56, 1938.

Lake, Kirsopp; Lake, Silva (editors). Dated Greek minuscule manuscripts to the year 1200. Volumes I to X. Boston, American Academy of Arts and Sciences, 1934–39.

Tillyard, Henry Julius Wetenhall. Handbook of the middle Byzantine musical notation. 48 p. (Monumenta Musicae Byzantinae subsidia, I, fasc. 1). Copenhagen, Levin & Munksgaard, 1935.

Reviewed by Helen Robbins Bittermann, *Speculum*, 11, 148–50, 1936.

Topping, Peter W. Modern Greek studies and materials in the United States. *Byzantion*, 15, 414–42, 1941.

Elaborate study showing the large amount of Greek materials available in our country. Would it not be worth while to prepare a union list of all the Greek imprints and MSS available? G. S.

Weitzmann, Kurt. Illustration for the Chronicles of Sozomenos, Theodoret and Malalas. *Byzantion*, 16, 87–134, 4 pls., 1944.

III. ORIENTAL SCIENCE AND CIVILIZATION

8. Asia (*generalities*)

Western Asia (*including "The ancient East" in general*)

Philby, H. St.J. Note on Kilwa, Transjordan. *Geographical Journal*, 102, 274–77, 1943.

Evidence of early domestication of camel in Near East is reviewed. 'The archaeological evidence seems to suggest that the camel was a familiar feature of the Middle East, including Arabia, from early neolithic times, and it is reasonable to assume that its domestication began in mesolithic times, when man was passing from the hunting to the pastoral and agricultural stage.' C. W. A.

Eastern Asia (*including works relative to the whole of Buddhist Asia, or to India, Central and Eastern Asia combined*)

Moore, Charles A. (editor). Philosophy — East and West. xi+334 p. Princeton, Princeton University Press, 1944 ($3.50).

The book is constructed as follows: four essays, respectively by William Ernest Hocking, Filmer S. C. Northrop, George P. Conger, and Charles A. Moore, deal with comparative philosophy; one, by Conger, with Indian philosophy; two, by Junjirō Takakusu and D. S. Suzuki, with Buddhism; two, by Chan Wing-tsit, with Chinese philosophy; one, by Shunzō Sakamaki, with Shintō. The longest chapter (67 p.), by Northrop, is a very elaborate study of the "complementary emphases of eastern intuitive and western scientific philosophy." An extract will give our readers some idea of his method. "The logical methods of definition and deduction can move within a given world of discourse, but they cannot move from one world of discourse to an entirely different one. This is the reason why no amount of logical manipulation by means of definition or deduction can take one from the wave-length for 'blue' which is a concept by postulation to the immediately sensed 'blue' which is a concept by intuition. Yet it is precisely this which the modern attempt to derive the aesthetically immediate factors which we directly apprehend from the interaction of postulated mental and material factors has tried to do. Modern philosophy has ended in failure because its basic thesis, that the aesthetically immediate is a secondary, purely phenomenal factor derived from the postulated, attempts what is logically impossible, namely the logical derivation or deduction of concepts by intuition from concepts by postulation. Consequently, modern Western epistemologists are being

gradually forced to the same position to which modern logicians have been led as a consequence of their analysis of the relation between empirical intuited and postulated theoretical factors in scientific method, the conclusion namely that there must be an irreducible concept by intuition as well as irreducible concepts by postulation. But to admit this is to accept the fundamental thesis of the Orient that the aesthetically immediate known solely by intuition and contemplation represents something scientifically and philosophically irreducible and ultimate."

I regretted that PAUL MASSON-OURSEL's early study (1923; *Isis*, 6, 99–104) was only referred to once, casually, in a footnote. G. S.

9. INDIA

Beck, Horace C. The beads from Taxila. Edited by Sir JOHN MARSHALL. (Memoirs of the Archaeological Survey of India, no. 65). Calcutta, Government of India Press, 1941.

Reviewed by DOROTHY MACKAY, *Antiquity*, 18, 201–04, 1944.

Chatterjee, Sir Atul; Burn, Sir Richard. British contributions to Indian studies. 52 p., 19 illus. London, The British Council, 1943. 1 sh.

Admirable summary of British Hindology considering in turn early studies, language studies and the vernaculars, early historical research, archaeology, educational influences, linguistic survey, anthropology, other sciences, cultural institutions and art. Twelve portraits plus other illustrations. As far as I know, CHARLES WILKINS' "Grammar of the Sanskrita language" was published only in 1808 (not 1779), but a smaller edition had perhaps been issued from HALHED's press before he left Bengal. The book of 1808 is a thick quarto volume of 682 p. In the preface dated London, Oct. 1, 1808, Sir CHARLES explains its genesis. He was inspired by the grammar of Bengali published at Hooghly, Bengal, 1778, by N. B. HALHED. He translated three native Sanskrit grammars into English but does not say that he published anything on the subject before 1808. G. S.

Coomaraswamy, Ananda K. On the one and only transmigrant. Supplement to the *Journal of the American Oriental Society*, 64, no. 3, 19–42, 1944.

Coomaraswamy, Ananda K. Recollection, Indian and Platonic. Supplement to the *Journal of the American Oriental Society*, 64, no. 3, 1–18, 1944.

[Coomaraswamy, Ananda K.]. The writings of ANANDA K. COOMARASWAMY. *Ars Islamica*, 9, 125–42, 1942.

Emeneau, M. B. Kota texts. Part one. University of California Publications in Linguistics, 2, no. 1, viii+192 p., Berkeley, 1944.

"The Kotas of the Nilgiri Hills in South India speak a Dravidian language, so far known to scholarship only through a few word lists of little value. The volume of Kota texts here presented includes all the text material that I collected during my linguistic field work with this community. On the basis of this material and my extensive field notes, which do not form part of texts, I hope to publish in the near future a grammar and vocabulary of the language. Meanwhile, this volume presents a linguistic introduction outlining the main features of the language." This first part of this work, dedicated to the memory of EDWARD SAPIR, contains 11 myths and tales; succeeding parts will include 26 more, plus 7 accounts of customs and a motif index by STITH THOMPSON. G. S.

Hill, A. V. India — scientific development or disaster. *Asiatic Review*, 40, 351–56, 1944.

Kirkpatrick, W. M. The secret code of the Gypsies in India. *Asiatic Review*, 40, 393–99, 1944.

Mackay, Ernest J. H. Chanhu-daro excavations, 1935–1936. xv+338 p., 2 frontispieces, 96 pls. (American Oriental Series, 20). New Haven, American Oriental Society, 1943.

Reviewed by G. V. BOBRINSKOY, *Journal of the American Oriental Society*, 64, 86–87, 1944.

Martí Ibáñez, Félix. Ensayo sobre la historia de la psicología y fisiología místicas de la India. Estudios de psicología religiosa. Prólogo de E. GARCIA DEL REAL. 174 p. Travajos de la Cátedra de Historia de la Medicina, Madrid, 1934.

Martí Ibáñez, Félix. Evolución histórica de la teoría india de los "chackras." *Revista de Información Terapéutica*, 170–77, 239–47, Barcelona, 1938.

Piggott, Stuart. Prehistoric copper hoards in the Ganges Basin. *Antiquity*, 18, 173–82, 4 figs., 1944.

Schmidt, Olaf H. The computation of the length of daylight in Hindu astronomy. *Isis*, 35, 205–11, 3 figs., 1944.

10. CHINA

Cammann, Schuyler. The development of the Mandarin Square. *Harvard Journal of Asiatic Studies*, 8, 71–130, 17 figs., 1944.

"In recent years many American museums and a number of private individuals have been developing collections of mandarin squares. These are the woven or embroidered plaques which served as badges of rank on the robes of Chinese officials from the Early Ming to the end of the Ch'ing Dynasty (1391–1912)." The birds and animals used on the insignia are studied p. 103–10. G. S.

Chu Shih-chia. Chinese local histories at Columbia University. *Harvard Journal of Asiatic Studies*, 8, 187–95, 1944.

"There are 1386 local histories in the Chinese collection of the Columbia University libraries. This makes it probably the third largest representation in this special field in the western hemisphere, and possibly among the ten largest in the world. Local histories from the province of Shantung alone amount to 208, a number exceeded (so far as present knowledge goes) only by the holdings of the National Library of Peiping, the Library of Congress, and Harvard University. Hopei, Kiangsu, Chekiang, Honan, and Shansi are also well represented."

Hollis, Howard. Chinese medicine and art. *Bulletin of the Medical Library Association*, 32, 318–23, 4 figs., 1944.

Hummel, Arthur W. (editor). Eminent Chinese of the Ch'ing period (1644–1912). Volume II, P-Z. p. 605–1103. Washington, U. S. Government Printing Office, 1944 ($2.00; whole work, $4.50).

The first half of this very important work published in 1943 was the subject of a long review (*Isis*, 34, 519–22). As its outstanding value is now generally recognized by every interested scholar, it will suffice to make only a few remarks apropos of the second half. The work is admirably completed and its practical value much increased by excellent indices. First a list of the 51 contributors, then a list of biographies in chronological order (birth dates range from c. 1520 to 1885, death dates from 1582 to 1912; the bulk of the notes refer to the three centuries, XVII to XIX), index of names (43 p.), index of books (38 p.), index of subjects (31 p.). On account of those indices, the work will be of use not simply as a biographical dictionary, but as a Ch'ing encyclopaedia. It will be one of the most useful reference books to every Sinologist. Dr. HU SHIH, late Chinese ambassador in Washington and one of the leading Chinese scholars of our time, has contributed a very instructive appendix, "A note on CH'ÜAN TSU-WANG, CHAO I-CH'ING and TAI CHÊN. A study of independent convergence in research as illustrated in their works on the *Shui-ching chu*." The *Shui-ching* (book of waterways) is an account of 137 Chinese rivers written before 265; the *Shui-ching chu* is an enormous commentary written by LI TAO-YÜAN (d. 527) expanding the original text to 42 times its size. That commentary has been the subject of more commentaries, controversies, and quarrels which have continued to the present day and which HU SHIH has brilliantly summarized. To appreciate how much has been written on the *Shui-ching* during the Ch'ing dynasty alone, see index p. 1059.

This very large work, including all the necessary Chinese type, is sold by the U. S. Government at an incredibly low price. This is a very wise policy, far superior to free distribution; it makes it possible for every scholar who really wants the book to buy it, yet avoids the wastage of copies. Let us hope that the excellent team gathered and drilled by Dr. HUMMEL, and now so much richer in experience, will be used for other tasks. The most obvious one would be to make similar investigations for other periods of Chinese history. G. S.

Tang Pei-sung. Biology in war-time China. *Nature*, 154, 43–46, 1944.

Pickens, Elizabeth Z. Moslems in China. *Moslem World*, 34, 255–60, 1944.

Purcell, Victor. Problems of Chinese education. viii+261 p. London, Kegan Paul, Trench, Trubner, 1936.

The first three chapters discuss the old system of education and the transition to the new one. Chapter IV is a study on the Chinese language and its applicability to modern needs. The study is of value because the author has a good knowledge of written as well as of spoken Chinese. He concludes that the use of a Western language is more appropriate than that of Chinese for the teaching of science; having reached a similar conclusion with regard to Arabic, I am easily persuaded with regard to Chinese, but it would take too long to explain my reasons. Chapter V is an elaborate analysis of the *San min chu i* (Three principles of the people), the collection of lectures delivered by Dr. SUN YAT-SEN (1866–1925) not long before his death and bequeathed to the Chinese Republic as a kind of political testament. That analysis is precious, because it includes the Chinese key words and phrases; it allows the author to continue his discussion of the language. The appendix contains analyses of the representative Chinese textbooks now in use. Students of the Chinese language and of the Chinese mind will find the reading of this book very profitable. G. S.

Walker, Egbert H. The plants of China and their usefulness to man. *Annual Report of the Smithsonian Institution* for 1943, 325–61, 12 pls., map, 1944.

Yao Shan-yu. Flood and drought data in the T'u-shu Chi-ch'êng and the Ch-ing Shih Kao. *Harvard Journal of Asiatic Studies*, 8, 214–26, 1944.

"While careful analytical studies of floods and droughts in Chinese history must be based on the records, such records themselves must be closely examined in order to determine not only their completeness and representativeness but also the reliability of any conclusions derived from such studies. To these two aims, then, this article is dedicated. It is hoped that from discussions presented below we not only can see how trustworthy our flood and drought data are, but also can obtain a clearer idea as to how adequate some of, if not all, the materials in the *T'u-shu Chi-ch'êng* really are." An appendix enumerates the floods and droughts in the *Ming shih* and *Ch'ing shih kao*. G. S.

11. JAPAN

Embree, John F. The Japanese. iv+42 p., 3 figs., 16 pls. Washington, D. C., Smithsonian Institution, War Background Studies, no. 7, 1943.

Wade, Ella N. Concerning a Japanese physician's honorary sword. *Transactions & Studies of the College of Physicians of Philadelphia*, 12, 88–89, 1 fig., 1944.

12. ISRAEL (*including works devoted to Palestine*)

Macht, David I. A biblical adventure in anatomy. *Bulletin of the History of Medicine*, 16, 169–74, 1944.

Resnikoff, Louis A. Jewish calendar calculations. *Scripta Mathematica*, 9, 274–77, 1943.

Trachtenberg, Joshua. The devil and the Jews: the medieval conception of the Jew and its relation to modern antisemitism. xiv+279 p. New Haven, Yale University Press, 1943.

Reviewed by GAINES POST, *American Historical Review*, 49, 698–99, 1944.

13. IRAN

Arberry, Arthur J. British contributions to Persian studies. 32 p., 12 pls. London, Longmans Green for The British Council, 1942.

"We have gone rather fully into the history of the period 1770–1840, because it seemed desirable to assemble the evidence on which we base our claim that the modern school of Persian studies owes almost all its inspiration to the work of a group of British scholars serving British interests in India." C. W. A.

Christensen, Arthur. L'Iran sous les Sassanides. 559 p. Copenhagen, Levin & Munksgaard, 1936.

Reviewed by BERNHARD GEIGER, *Byzantion*, 15, 483–85, 1941.

Pope, Arthur Upham; Ackermann, Phyllis. A survey of Persian art from prehistoric times to the present. 6 vols. Published under the auspices of the American Institute for Iranian Art and Archaeology. London, Oxford University Press, 1938–39.

The whole volume VIII of *Ars Islamica* (the splendid journal published by the University of Michigan Press) is devoted to learned criticisms of POPE'S *Survey*. That is a very unusual procedure but justified by the extraordinary size of that *Survey*, some 2,800 pages with about 1000 text illustrations and 1,482 plates, contributed by sixty-nine scholars! The reviews extending to 214 p. richly illustrated were written by 9 scholars. They constitute a kind of supplement to the *Survey*. Vol. IX of *Ars Islamica* (1942) contains POPE'S answer (p. 169–208) and rejoinders by M. S. DIMAND and ERICH SCHROEDER. The controversy is not finished and never will be, for POPE'S *Survey* was meant to cover the whole field. G. S.

14. ISLAM (*also Arabia*)

Arberry, Arthur John. An introduction to the history of Sufism. The Sir Abdullah Suhrawardy Lectures for 1942. xx+84 p. London, Longmans, Green, 1943.

Reviewed by WILLIAM THOMSON, *Moslem World*, 35, 63–66, 1945.

Della Vida, G. Levi. Remarks on a recent edition of Arabic papyrus letters. *Journal of the American Oriental Society*, 64, 127–37, 1944.

Apropos of KARL JAHN'S study (Prague 1937). G. S.

Della Vida, Giorgio Levi. Ricerche sulla formazione del più antico fondo dei manoscritti orientali della Biblioteca vaticana. viii+528 p., 21 pls. ("Studie e testi," no. 92). Città del Vaticano, 1939.

Reviewed by M. SPRENGLING, *Journal of Near Eastern Studies*, 2, 316, 1943.

Donaldson, Bess Allen. The wild rue. A study of Muhammadan magic and folklore in Iran. xii+216 p., 6 pls. London, Luzac, 1938.

Very full account of Muslim superstitions as they occur in Iran, that is, the common superstitions of Islām plus Shī'a accretions or modifications. The title refers to the use of seeds of wild rue in protective incantations. "Most of the material has been collected within the province of Khorasan, but since pilgrims come to the 'sacred city' of Meshed from all over Iran, many of them to remain for the rest of their lives, its population is after all a representative group. Many of the women from whom information has been obtained were originally from Kerman, Yezd, Isfahan and Teheran, as well as from many villages in the vicinities of these cities; others, in smaller numbers, have come from Hamadan, Resht, and Tabriz." The author has also used various Oriental books, chiefly the *Wonders of creation* of AL-QAZWĪNĪ (XIII–2); one of the shorter versions of that book was completed in 1263 (not 1363, p. viii). G. S.

Inayatullah, Shaikh. Geographical factors in Arabian life and history. Being an inquiry into the influence of physico-geographical environment upon Arabian life and institutions. xi+160 p. Lahore, Sh. Muhammad Ashraf, August 1942 (Rs. 5/8).

"The present work reproduces, in a slightly revised form, the dissertation, which I wrote as a Government of the Panjab Scholar in the University of London during the years 1929–31, and which was accepted by that University as a Thesis for the degree of Doctor of Philosophy (in Arabic). The work on the Thesis was commenced under the direction of the late Dr. Sir THOMAS W. ARNOLD; and, after his lamented death in June 1930, was continued under the guidance of his successor, Professor H. A. R. GIBB." . . . "It is designed to be a geographical interpretation of Arabian life and institutions."

The author discusses the location of Arabia, its climate, the general economy of Arabian life, domestic animals, the oasis community of central Arabia, health, etc. He has drunk deeply from the Arabic and European sources. Many Arabic quotations illustrate his text. G. S.

Jeffery, Arthur. An Armenian account of Islam and the Arab conquests. Translated by TERENIG POLADIAN. *Moslem World*, 35, 44–62, 1945.

Modern account by K. IZIANTS translated from his introduction to the Armenian historian, GHEVOND (2d. ed., St. Petersburg 1887). G. S.

Lewis, Bernard. British contributions to Arabic studies. 30 p., 7 pls. London, Longmans Green for the British Council, 1941.

English version of broadcast talks in Arabic, published in the Arab Listener. 1. ADELARD OF BATH, DANIEL OF MORLEY and other scholars who visited Spain. 2. WILLIAM BEDWELL (1561–1632), EDWARD POCOCKE (1604–91) and other pioneer Arabists. 3. SIMON OCKLEY (1678–1720), GEORGE SALE (1697–1736) and other interpreters of Islamic culture. 4. E. W. LANE (1801–76), E. H. PALMER (1840–82) and others of early nineteenth century. 5. R. F. BURTON (1821–90), C. M. DOUGHTY (1843–1926) and some twentieth-century scholars. C. W. A.

Majluf, T. La medicina árabe y su influencia en Occidente. *Anales de la Sociedad Peruana de Historia de la Medicina*, 6, 37–48, 1944.

Meyerhof, Max. The background and origins of Arabian pharmacology, pp. 1847–56, illus.; Pharmacology during the Golden Age of Arabian medicine, pp. 1857–67, illus.; Arabian pharmacology in North Africa, Sicily, and the Iberian Peninsula, pp. 1868–72, illus.; The sources of the history of Arabian medicine, pp. 1873–75, illus. *Ciba Symposia*, 6, 1944.

Millás Vallicrosa, José Mª. Un ejemplar de azafea árabe de AZARQUIEL. *Al-Andalus*, 9, 111–19, 2 pls., 1944.

Discussion of an astrolabe preserved in the Academy of Barcelona comparable to the ṣafīḥa of AL-ZARQĀLĪ but dated 1252/3. G. S.

Philby, H. St.J. HALÉVY in the Yaman. *Geographical Journal*, 102, 116–24, 1943.

Controverting the claim of HAYYIM HABSHUSH that it was he, and not JOSEPH HALÉVY, who copied all the inscriptions brought back by the latter. "My conclusion from the evidence before us is that while HABSHUSH certainly travelled over most of the ground covered by HALÉVY and copied inscriptions, he did not do so in HALÉVY's company." (See *Isis*, 35, 76, 1944). C. W. A.

Sarton, George. Answer to Query no. 25. Orientation of the miḥrāb in mosques (*Isis*, 20, 262–64). *Isis*, 35, 176, 1944.

Sprengling, M. The Berlin Druze lexicon — concluded. *Journal of Near Eastern Studies*, 2, 211–48, 1943.

"Herewith is completed the publication of the fifty-four folia of the Druze Lexicon stamped 'Ex Bibl. Regia Berolin.' which was begun in *AJSL* 56 (1939), 388–414 (see especially pp. 412 ff.), and continued in *AJSL*, 57 (1940), 75–94, and 58 (1941), 91–98."

Tannous, Afif I. The Arab village community of the Middle East. *Annual Report of the Smithsonian Institution* for 1943, 523–43, 14 pls., 1944.

Twichell, K. S.; Wathen, A. L.; Hamilton, J. G. Report of the United States Agricultural Mission to Saudi Arabia, 1943. English text, 147 p.; Arabic, 192 p. Published at Washington, printed in Cairo, Egypt.

Reviewed by S. M. ZWEMER, *Moslem World*, 35, 68, 1945.

Worrell, W. H. Jummal notation. *Scripta Mathematica*, 9, 272–74, 1943.

Worrell, W. H. The terminology of Arabic goniometrical works. *Journal of Near Eastern Studies*, 3, 91–100, 7 figs., 1944.

IV. NEW WORLD AND AFRICA

(a) AMERICA

Becker, C. O. The Megalithic ruins at Cuzco, Peru. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 129–38, 13 figs., 1943.

Bennett, Wendell C. Archeological regions of Colombia: a ceramic survey. Yale University Publications in Anthropology, no. 30, 120 p., 12 pls., 26 figs. New Haven, Yale University Press, 1944.

Ford, James A. Excavations in the vicinity of Cali, Colombia. Yale University Publications in Anthropology, no. 31, 82 p., 4 pls., 19 figs. New Haven, Yale University Press, 1944.

Kluckhohn, Clyde. Navaho witchcraft. Papers of the Peabody Museum of American Archaeology and Ethnology, Harvard University, vol. 22, 33–36, 39–40, 41–44, 45–72, 145–49, 1944.

Lastres, Juan B. Medicina aborigen peruana. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 130–51, Baltimore, 1944.

Leighton, Alexander H.; Leighton, Dorothea C. The Navaho door. An introduction to Navaho life. xviii+149 p., 36 ills. Cambridge, Mass., Harvard University Press, 1944.

Reviewed by E. H. ACKERKNECHT, *Bulletin of the History of Medicine*, 16, 329, 1944.

Vélez López, Lizardo. El interesante cráneo de las chullpas de Sinsicap. *Anales de la Sociedad Peruana de Historia de la Medicina*, 6, 91–95, 2 pls., 1944.

(b) OCEANIA

Du Bois, Cora. The people of Alor. A social-psychological study of an East Indian island. With analyses by ABRAM KARDINER and EMIL OBERHOLZER. xvi+654 p., pls. Minneapolis, University of Minnesota Press, 1944.

"The primary purpose of this book is to discuss the relationship between peopie and their institutions in a village complex called Atimelang on the island of Alor [Dutch East Indies]. This is not an exercise in the esoteric, but rather an attempt to understand a problem so basic that our own social development will continue to be faltering and awkward until the questions involved are clearly understood. In its simplest form the question is: Why is an American different from an Alorese?"

Part 3 contains eight elaborate autobiographies (p. 191–551) of native Alorese. G. S.

PART III

SYSTEMATIC CLASSIFICATION

I. SCIENCE IN GENERAL

16. HISTORY OF SCIENCE

Barnouw, A. J.; Landheer, B. (editors). The contribution of Holland to the sciences. A symposium. With an introduction by P. DEBYE. xvii+373 p., 13 ills. New York, Querido, 1943.

Reviewed by GEORGE SARTON, *Isis*, 35, 189–90, 1944.

Beltrán, Enrique. Setenta y cinco años de ciencias naturales en México. *Revista de la Sociedad Mexicana de Historia Natural*, 4, 245–64, 1943.

[Cambridge, University of]. An exhibition of historic scientific instruments and books in the East room of the old schools, 4–11 November 1944. 19 p.

"The Exhibition will be opened by Sir HENRY DALE, President of the Royal Society, on Saturday, 4 November, at 2.45 p.m. The Exhibits are drawn from the Collection which Mr. R. S. WHIPPLE is presenting to the University and will form a nucleus for a History of Science Museum and Library in Cambridge."

Dampier, Sir William Cecil. A shorter history of science. x+189 p. Cambridge, University Press; New York, The Macmillan Co., 1944 ($2.00).

Sir WILLIAM needs no introduction to the readers of these pages. For many years his *A history of science and its relations with philosophy and religion* (ed. 1, 1929, reviewed in *Isis*, 14, 263–65; ed. 3, 1942, reviewed in *Isis*, 34, 448) has been one of the best single-volume introductions to our subject. This work, based on the larger volume, is a masterpiece of condensation. Within its 189 pages, one finds the whole gamut of the history of science admirably told, from the Paleolithic Age to the era of Relativity. And, despite the small number of pages, there is space devoted to backgrounds of scientific achievement, to biographical information, to direct quotation from major scientists, and even two pages of bibliography. A small compact volume, nicely printed, with text illustrations and plates, it seems a veritable "kit-bag" history of science. It will prove most useful as an outline for teachers and as a textbook in shorter courses in the history of science. The eleven chapter headings follow: 1 — The origins, 2 — Greece and Rome, 3 — The Middle Ages, 4 — The Renaissance, 5 — GALILEO and NEWTON: the first physical synthesis, 6 — The eighteenth century, 7 — Physics and chemistry of the nineteenth century, 8 — Nineteenth-century biology, 9 — Recent biology, 10 — The new physics and chemistry, 11 — The stellar universe. I. B. C.

Glicksberg, Charles I. Literature and science: a study in conflict. *Scientific Monthly*, 59, 467–72, 1944.

Jaffe, Bernard. Men of science in America. xl+600 p., ill. New York, Simon and Schuster, 1944.

Reviewed by I. E. DRABKIN, *Bulletin of the History of Medicine*, 16, 327–28, 1944.

Martin, Thomas. The Royal Institution. 46 p., illus. London, British Council, 1942.

Mieli, Aldo. La historia y la filosofía de la ciencia. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 205–16, Baltimore, 1944.

Needham, Joseph (editor). Science, religion, and reality. 396 p. New York, Macmillan, 1928.

This collection contains some excellent discussions of many subjects upon which the historian of science is repeatedly obliged to focus his thought. The late MALINOWSKI's essay on "Magic, science, and religion" (p. 19–84) is the best of its kind I have ever read. CHARLES SINGER's "Historical relations of science and religion" is learned and full of wise observations. ARTHUR S. EDDINGTON's "Domain of physical science" and JOSEPH NEEDHAM's "Mechanistic biology" are both instructive and stimulative. Lord BALFOUR's introduction restates in clear and forceful language some of the ideas he had explained more fully in his Gifford lectures (1914, 1923). A book of lasting value. G. S.

[SARTON, GEORGE]. Sarton presentation volume, edited by M. F. ASHLEY MONTAGU. *Isis*, 35, 212, 1944.

Apropos of the Festschrift presented to G. SARTON for his sixtieth birthday on August 31, 1944. It was presented in typescript and the printing of it may be delayed.

Sarton, George. Sixty-sixth Critical Bibliography of the history and philosophy of science and of the history of civilization (to July 1944). *Isis*, 35, 221–78, 1944.

Sigerist, Henry E. The history of science in postwar education. *Science*, 100, 415–20, 1944.

Società italiana per il progresso delle scienze. Anno 100° della 1ª riunione degli scienziati italiani. Un secolo di progresso scientifico italiano, 1839–1939. Opera storica redatta da circa 200 collaboratori sotto la direzione del comitato scientifico della S.I.P.S. Pubblicazione a cura del segretario generale Prof. LUCIO SILLA. 6 vols. Milano, Hoepli, 1939.

Reviewed by GEORGE SARTON, *Isis*, 35, 190–91, 1944.

Timoshenko, S. P.; Uspensky, J. V. Remarks on the history of science in Russia. *Science*, 100, 193–94, 1944.

Uccelli, Arturo (editor). Enciclopedia storica delle scienze e delle loro applicazioni. Opera compilata con la collaborazione di eminenti specialisti. Vol. I. Le scienze fisiche e matematiche. xxiii+730 p., 1788 figs., 9 colored pls. Milano, Ulrico Hoepli, April 3, 1941 = XIX (paper covers, L.250; bound, L.300).

The Fascist government attached considerable importance to the teaching of the history of science, properly subordinated to national purposes. This was well explained by ALFREDO PERNA at the congress of Lisbon 1936 (*Isis*, 28, 135–38, 244) and again in the series entitled "Un secolo di progresso scientifico italiano" (Milano 1939; *Isis*, 35, 190). The present volume, the first of a new collection, is an admirable collection of scientific illustrations, including many portraits, with a text explaining the development of science from the beginnings to the present days. It is clearly an imitation of the two volumes edited by GEORGES URBAIN and MARCEL BOLL in the Larousse series (Paris 1933–34; *Isis*, 22, 397; 23, 578). Indeed, the general plan is the same.

The present volume is divided into two parts, I. History of science to 1800, II. Science in the nineteenth century. The second part is subdivided as follows: Mathematics, Units, Mechanics, States of Matter, Vibrations and Acoustics, Heat, Optics, Electricity and Magnetism, Chemistry, Astrophysics. Each section is written by a specialist. The book is very attractive but of little value to the scholar, because it is too short and dogmatic and contains no references whatsoever.

The general editor was unknown to me, except for a few articles of his on LEONARDO DA VINCI (*Isis*, 35, 60). The book was obtained in June 1944 from the Istituto per le relazioni culturale con l'estero, Palazzo Firenze, Rome, thanks to the kindness of a friend. It is an enormous volume weighing 7½ pounds. G. S.

17. ORGANIZATION OF SCIENCE

(Internal organization is meant, see Isis, 1, 195. For external organization, national or international, see section 55).

Baker, John R. The scientific life. 154 p. New York, Macmillan, 1943.

Reviewed by M. F. ASHLEY MONTAGU, *Isis*, 35, 191–92, 1944.

Dale, Sir Henry. International activities in science. *Nature*, 154, 724–26, 1944.

Needham, Joseph. An international science cooperation service. *Nature*, 154, 657–660, 1944.

18. PHILOSOPHY OF SCIENCE

Cassirer, Ernst. Filosofía de la ilustración. Versión castellana de EUGENIO IMAZ. 343 p. México, Fondo de Cultura Económica, 1943.

Reviewed by LILIA ELSA SEGURA, *Minerva*, 1, 171–75, Buenos Aires, 1944.

Dadourian, H. M. The principle of the unobservable. *Scientific Monthly*, 59, 293–95, 1944.

Hill, D. W. The impact and value of science. 88 p. Hutchinson's Scientific and Technical Publications, London, 1944.

Reviewed by E. T. WHITTAKER, *Endeavour*, 3, 163, 1944.

Langevin, Paul. La física actual y el determinismo, trad. FERNANDO CARBONELL. 75 p. Montevideo, Colección Cultura, ed. Claudio García, 1944.

Reviewed by M. B., *Minerva*, 1, 184–85, Buenos Aires, 1944.

Lindemann, Hans A. El "circulo de Viena" y la filosofía científica. *Minerva*, 1, 123–51, Buenos Aires, 1944.

Milne, Edward Arthur. The fundamental concepts of natural philosophy. *Proceedings of the Royal Society of Edinburgh*, 62, 10–24, 1943.

James Scott Lecture delivered on May 3, 1943.

Neuschlosz, Simon M. El irracionalismo en la física contemporánea. *Minerva*, 1, 44–49, Buenos Aires, 1944.

II. FORMAL SCIENCES
(*Knowledge of Forms*)

19. Logic and Theory of Knowledge

Quine, Willard Van Orman. O sentido da nova lógica. 252 p. (Biblioteca de Ciências Sociais, III). São Paulo, Martins, 1944.

This Portuguese account of Quine's logistic studies is very welcome for many reasons, one of them (not the least important) being that it creates a new spiritual bridge between the two sister republics, Brazil and the United States. Our readers are familiar with Quine's work, because his main publications were reviewed in *Isis* soon after their appearance: A system of logistic (Harvard University Press, 1934; *Isis*, 24, 168–72); Mathematical logic (New York 1940; *Isis*, 33, 289–91); Elementary logic (Boston 1941; *Isis*, 34, 73). G. S.

20. Mathematics

Bateman, Harry; Archibald, Raymond Clare. A guide to tables of Bessel functions. *Mathematical tables and other aids to computation*, 1, 205–308, 1944.

"Two features of the *Guide* which the undersigned regard as of special importance are (1) the complete listing of every known Unpublished Table of Bessel Functions now available for consultation: (2) the assembly of information regarding known Errors in the tables recorded. In every case we have attempted to indicate the author or the discoverer of the errors, with exact references to their places of publication, when published. In some cases such lists are reprinted. But a number of errata lists appear in print for the first time in this *Guide*."

Boyer, Carl B. Fundamental steps in the development of numeration. *Isis*, 35, 153–68, 5 figs., 1944.

Boyer, Carl B. Pascal's formula for the sums of powers of the integers. *Scripta Mathematica*, 9, 237–44, 1944.

Boyer, Carl B. Zero: the symbol, the concept, the number. *National Mathematics Magazine*, 18, 323–30, 1944.

Brasch, Frederick E. David Eugene Smith (an appreciation). *Science*, 100, 257–59, 1944.

Courant, Richard; Robbins, Herbert. What is mathematics? An elementary approach to ideas and methods. xix+521 p., 287 figs. New York, Oxford University Press, 1941.

Reviewed by I. Bernard Cohen, *Isis*, 35, 219, 1944.

Fraenkel, Abraham Adolf. Problems and methods in modern mathematics. *Scripta Mathematica*, 9, 245–55, 1943.

Higgins, Thomas James. Biographies and collected works of mathematicians. *American Mathematical Monthly*, 51, 433–45, 1944.

Keyser, Cassius Jackson. Man and men. *Scripta Mathematica*, 9, 232–36, 1943.

McCoy, John Calvin. The anatomy of magic squares. *Scripta Mathematica*, 9, 278–84, 1943.

Neumann, John von; Morgenstern, Oskar. Theory of games and economic behavior. xviii+625 p., 103 figs. Princeton, Princeton University Press, 1944 ($10.00).

There are a number of mediaeval treatises describing the game of chess as applied to morality and military tactics. A similar approach to economic and social problems is offered in this book, but on a much deeper foundation and with an incomparably greater seriousness. Say the authors: "This book contains an exposition and various applications of a mathematical theory of games. The theory has been developed by one of us since 1928 and is now published for the first time in its entirety. The applications are of two kinds: On the one hand to games in the proper sense, on the other hand to economic and sociological problems which, as we hope to show, are best approached from this direction. The applications which we shall make to games serve at least as much to corroborate the theory as to investigate these games. The nature of this reciprocal relationship will become clear as the investigation proceeds. Our major interest is, of course, in the economic and sociological direction. Here we can approach only the simplest questions. However, these questions are of a fundamental character. Furthermore, our aim is primarily to show that there is a rigorous approach to these subjects, involving, as they do, questions of parallel or opposite interest, perfect or imperfect information, free rational decision or chance influences." The book is not meant to be read but to be studied; it will delight mathematicians and frighten away all others. G. S.

Northrop, Eugene P. Riddles in mathematics. 7+226+36 p. New York, Van Nostrand, 1944.

Reviewed by Howard Eves, *Scripta Mathematica*, 9, 269–71, 1943.

Whitlock, W. P., Jr. Rational right triangles with equal areas. *Scripta Mathematica*, 9, 155–61, 265–67, ills., 1943.

III. PHYSICAL SCIENCES
(*Knowledge of inorganic nature*)

23. Astronomy

Connor, Elizabeth. Astrology is not extinct. *Publications of the Astronomical Society of the Pacific*, 55, 12–18, Oct., 1943.

Fotheringham, David Ross. The date of Easter and other Christian festivals. With a preface

by Lord DESBOROUGH. xv+56 p. London, Society for Promoting Christian Knowledge, 1928.

Jeans, Sir James. The universe around us. x+297 p., 32 pls. 4th ed. Cambridge, University Press, 1944.

Reviewed by H. SPENCER JONES, *Endeavour*, 3, 163, 1944.

Jones, Sir Harold Spencer. The Royal Observatory, Greenwich. 44 p., illus. (Science in Britain). London, Longmans Green & Co., 1944.

Short but authoritative and well illustrated history of the Greenwich Observatory. G. S.

Rayleigh, Lord. Meteorites and some of the problems which they present. *Endeavour*, 3, 127–34, 8 figs., 1944.

Spurr, J. E. Geology applied to selenology. The Imbrian Plain region of the moon. viii+112 p., 4 pls., 23 figs. Lancaster, Pa., Science Press, 1944.

"The surface of the moon as shown in photographs displays phenomena which are related to phenomena that we describe as volcanicity on the earth. They are sufficiently like those of the earth to be recognized as due to somewhat similar causes, while in their differences they illustrate the differences between the two bodies. The most important difference is that the igneous phenomena of the moon are the records of stiffening and hardening of the original crust, with attendant effervescence from the interior; while on the earth the records of this pristine period have long since been obliterated. The differences, indeed, are so great that the lunar phenomena are difficult to interpret if one has always in mind terrestrial examples and standards. It is best to put these into the background, and approach the problems, so far as possible, without preconceptions. We are privileged, in examining the moon's surface, to witness a stupendous and unique spectacle: the record and the result of the crusting over of a fluid sphere, the last stages of which were quieted untold ages ago."

24. PHYSICS

Dorsey, N. Ernest. The velocity of light. *Transactions of the American Philosophical Society*, 34, 110 p. Philadelphia, 1944.

Elaborate study of all the determinations of the velocity of light from the time of FIZEAU (1849) to ours. Determinations prior to 1928 seem to be of historical interest only. The author concludes against GHEURY DE BRAY (*Isis*, 25, 437–48, 1936) that there is no secular variation. The best value of the velocity in a vacuum is 299773 km./sec. with a probable error of less than 10 km./sec. That natural constant is thus known with an extreme precision. G. S.

Higgins, Thomas James. Book-length biographies of physicists and astronomers. *American Journal of Physics*, 12, 234–36, 1944.

Jordan, Pascual. Physics of the 20th century. Translated by ELEANOR OSHRY. xii+185 p. New York, Philosophical Library, 1944.

Reviewed in *Nature*, 154, 751, 1944.

25. CHEMISTRY, PHYSICAL CHEMISTRY, INDUSTRIAL CHEMISTRY

Higgins, Thomas James. Book-length biographies of chemists. *School Science and Mathematics*, 650–65, October 1944.

Leggett, William F. Ancient and medieval dyes. Brooklyn, N. Y., Chemical Publishing Co., 1944.

This is a small but highly informative volume presenting a brief but fairly complete account of the vegetable, animal, and mineral dyes employed by man since early antiquity. It is lucidly written and the material is accurate and well organized, making interesting reading. Students of chemistry, history, and sociology alike will find it profitable, because the story of dyes cuts across all these fields. Like every other human activity involving scientific knowledge and its utilization, the subject offers many interesting problems in the influence of belief, invention, habit, and vested interests upon the course of progress. M. G.

Sahyun, Melville (editor). Outline of the amino acids and proteins. 251 p., ills. New York, Reinhold, 1944.

Much historical material is to be found in this excellent cooperative compilation. Each of the twelve chapters is introduced by a picture and a brief biographical account of outstanding contributors to our knowledge of proteins and amino acids. Chapter I, "Discovery of the amino acids," by the editor, is an excellent historical summary, which well supplements "The history of the discovery of the amino acids" by H. B. VICKERY and C. L. A. SCHMIDT (*Chemical Reviews*, 9, 169, 1931). C. D. L.

26. TECHNOLOGY

(*For Mining, see* 32. Geology; *for Industrial Chemistry*, 25. Chemistry. *See also* Arts and Crafts, *under* 45)

Curwen, E. Cecil. The problem of early watermills. *Antiquity*, 18, 130–46, 4 pls., 6 figs., 1944.

"Of the two varieties of water-mill, that possessing a vertical shaft, being the more primitive, is presumably the earlier, while that of VITRUVIUS, having a horizontal shaft and gears, seems to be an engineer's improvement of the primitive form. The vertical mill is essentially an instrument of peasant-culture, being just a mechanized quern; the Vitruvian mill, on the other hand, was developed by an urban culture and, while frequently serving peasant communities, has lent itself to milling on a commercial scale."

Deerr, Noel; Brooks, Alexander. The early use of steam power in the cane sugar industry. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 11–21, 5 figs., 1943.

Deerr, Noel; Brooks, Alexander. The evolution of the sugar cane mill. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 1–9, 10 figs., 1943.

Dickinson, H. W.; Rogers, Henry. Origin of gauges for wire, sheets and strip. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 87–98, 10 figs., 1943.

Dufton, A. F. Early application of engineering to the warming of buildings. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 99–107, 1943.

Kleinschmidt, H. E. Evolution of the wheel. *Scientific Monthly*, 59, 273–82, 10 illus., 1944.

Lee, Charles E. Early railways in Surrey. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 49–79, 6 figs., 1943.

Hamilton, S. B. The use of cast iron in building. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 139–55, 8 figs., 1943.

Mack, Gerstle. The land divided; a history of the Panama Canal and other Isthmian canal projects. xlix+650 p., 45 illus., 17 maps. New York, Knopf, 1944.

Reviewed by ERWIN H. ACKERKNECHT, *Bulletin of the History of Medicine*, 16, 93–94, 1944.

Pearson, C. E. The history of the hydraulic extrusion process. *Transactions of the Newcomen Society*, vol. 21, 109–21, 13 figs., 1943.

Technological trends and national policy. Including the social implications of new inventions. Report of the Subcommittee on Technology to the National Resources Committee. x+388 p., 73 figs. Washington, U. S. Government Printing Office, 1937 ($1.00).

Contents: Part one — Social aspects of technology: I. National policy and technology; II. The prediction of inventions; III. Social effects of inventions; IV. Resistances to the adoption of technological innovations; V. Unemployment and increasing productivity.

Part two — Science and technology: I. The relation of science to technological trends; II. The interdependence of science and technology.

Part three — Technology in various fields.

White, George. A history of early needle-making. *Transactions of the Newcomen Society*, vol. 21, for 1940–41, 81–87, 4 figs., 1943.

IV. BIOLOGICAL SCIENCES

(Knowledge of organic nature)

27. BIOLOGY (*Generalities, "Natural History"*)

Agar, W. E. A contribution to the theory of the living organism. 207 p. London, Oxford University Press, 1943.

Reviewed in *Nature*, 154, 289, 1944.

Burkill, I. H. The biogeographic division of the Indo-Australian Archipelago. A history of the divisions which have been proposed. Proceedings of the Linnean Society of London, 154th Session, part 2, 127–38, 8 maps, 1941–42.

Griffin, Francis J.; Sherborn, C. Davies; Marshall, H. S. A catalogue of papers concerning the dates of publication of natural history books. *Journal of the Society for the Bibliography of Natural History*, 1, 1–30, 1936; 2, 1–18, 1943.

Holmes, S. J. Life, morals, and HUXLEY's "Evolution and Ethics." Science in the University, 319–32, University of California Press, 1944.

Huxley, Julian. Evolution: the modern synthesis. 645 p. New York, Harper and Bros., 1943.

Reviewed by CONWAY ZIRKLE, *Isis*, 35, 192–94, 1944.

Journal of the Society for the Bibliography of Natural History. London. Published by the Society, 41, Queen's Gate, S.W.7, 1936 ff.

The first number of this journal appeared on Oct. 17, 1936; the 12th no. completing vol. 1 (488 p.), on Feb. 20, 1943; the first no. of vol. 2 (p. 1–18), on Dec. 6, 1943. "The Society for the Bibliography of Natural History is a scientific society instituted for the study of the bibliography of all branches of zoology, botany and geology. The Society pursues the objects for which it has been founded, mainly in the following ways: — (1) The Society publishes a journal containing collected lists of bibliographical papers already published on various branches of natural history; original contributions in regard to the dates of publication of zoological, geological and botanical works; particulars relating to the disposal of the libraries and collections of deceased naturalists; and papers on bibliographical subjects. It is proposed also, from time to time, to publish in the journal facsimile reproductions of rare or unique works or parts of works on natural history. Copies of this journal will be issued free to members of the Society. It is hoped also to publish from time to time original works on special aspects of the bibliography of natural history. (2) The Society maintains a card index catalogue containing references to all published papers on bibliographical subjects, which is available for consultation by members of the Society on application to the Secretary." . . . "The subscription has been fixed at the rate of one guinea per annum."

The founder and first president of the Society was

CHARLES DAVIES SHERBORN (1861–1942), an excellent biography of whom has recently been published by JOHN ROXBROUGH NORMAN (1898–1944). The early history of the Society was told by the treasurer, FRANCIS HEMMING, in vol. 1, p. xi–xiv.

The articles published in that journal are so numerous that we cannot list them all in our bibliography. We shall list only those of a more general nature, facsimile editions, and the articles referring to periods anterior to the nineteenth century. We take it for granted that every historian of natural history in the nineteenth and twentieth centuries will consult this journal repeatedly. G. S.

Just, Theodor. The rates of evolutionary processes. *Proceedings of the Indiana Academy of Science*, 53, 14–27, 1944.

Ridley, G. N. Man studies life: the story of biology. x+109 p. (Thinker's Library, no. 97). London, Watts, 1944.

Reviewed by T. H. H., *Nature*, 154, 503, 1944.

Verdoorn, Frans. Future of biology in world affairs. *Nature*, 154, 595–99, 1944.

Verdoorn, Frans. On the aims and methods of biological history and biography. With some notes for the collaborators of the *Index Botanicorum*. *Chronica Botanica*, 8, 427–48, illus., 1944.

28. BOTANY

(*Agronomy, Phytopathology, Palaeobotany*)

Burkill, I. H.; Merrill, E. D. Answer to Query 104. What is lucerrage? (*Isis*, 34, 512). *Isis*, 35, 176–77, 1944.

Cook, O. F. Natural rubber. *Annual Report of the Smithsonian Institution* for 1943, 363–411, 20 pls., 1944.

Correll, Donovan S. The African oil palm: its history, cultivation and importance. *Lloydia*, 7, 101–20, 1944.

The "African" oil palm is now growing as an escape in the tropics of both the Old and the New World. Apparently it crossed the Atlantic Ocean in the early days of the slave trade, but which way it crossed is uncertain. Today it is the source of a commodity of great importance. C. Z.

Correll, Donovan S. Vanilla: its history, cultivation and importance. *Lloydia*, 7, 236–64, 1944.

Vanilla, a flavor extracted from three species of the orchid, *Vanilla*, was used by the Aztecs to season their chocolate. It was first introduced into Europe as an article of commerce in 1510 and its use has been widespread ever since. After tracing the history of its migration and culture, this paper gives a brief account of its botany and of its present economic importance. C. Z.

Croizat, Leon. History and nomenclature of the higher units of classification. *Bull. Torrey Bot. Club*, 72, 52–75, 1945.

A short history of the attempt, between the time of the publication of LINNAEUS' *Systema naturae* (1735) and the present, to arrange plants in a natural rather than in an artificial system. C. Z.

Erdtman, G. An introduction to pollen analysis. Foreword by ROGER P. WODEHOUSE. xv+239 p., 28 pls., figs. (New series of plant science books, edited by FRANS VERDOORN, Vol. 12). Waltham, Mass., Chronica Botanica, 1943 ($5.00).

Pollen surveys of the air at various places and times have often been made, but the study of fossil pollen is relatively new. The father of modern pollen analysis is the Swede, NILS GUSTAF LAGERHEIM (1860–1926), professor of botany in Stockholm. He had been partly anticipated by a few others such as the Swiss geologist, J. FRÜH, in the latter's study of peat (1885), but LAGERHEIM was the first master. The new science received its birth certificate from the Swedish geologist, LENNART VON POST (b. 1884), at the meeting of Scandinavian naturalists, Oslo 1916. It grew rapidly, more than 1500 papers have already been devoted to it! The present volume is a much needed introduction which will please equally botanists and geologists. After an historical outline (p. 3–8) the chemistry of peat is explained. Methods of pollen preparation are dealt with in ch. 3–4, pollen and spore morphology in ch. 5 to 10. Ch. 11, Graphic presentation of pollen analyses; 12. Palaeoclimatology, geology and archaeology; 13. Output and dissemination of pollen; 14. Surface samples; 15. Pollen flora of peat samples; 16. Geographical survey. Pollen statistical investigations in different countries; 17. Tertiary deposits; 18. Pollen analysis of honey and drugs. The author, like many of the pioneers, is a Swede; his first paper on the subject appeared as "early" as 1921. Portraits of pioneers on p. 231ff. DR. FRANS VERDOORN, the courageous and resourceful editor of this series, is planning the publication of other "pollen" books, R. P. WODEHOUSE on hayfever plants, A. M. MAURIZIO on pollen and honey, E. C. STACKMAN on aerobiology. He deserves to share our gratitude with the authors, and to the *Chronica Botanica* we say, "Crescat et floreat!" G. S.

Fussell, G. E. The collection of agricultural statistics in Great Britain: its origin and evolution. *Agricultural History*, 18, 161–86, 1944.

Although the desirability of agricultural statistics was suggested by GRAUNT as early as 1676 and certain attempts were made to secure them during the eighteenth century, it was not until later in the nineteenth century that good statistical information was available. C. Z.

Gaut, R. C. A history of Worcestershire agriculture and rural evolution. xvi+490 p. Worcester, Littlebury, 1939.

Reviewed by E. J. RUSSELL, *Nature*, 154, 190–91, 1944.

Howard, Alexander L. The beech tree. *Nature*, 154, 492–94, 1944.

Howard, Alexander L. Deciduous cypress (*Taxodium distichum*). *Nature*, 154, 775–76, 1944.

Howard, Alexander L. The Scots pine (*Pinus sylvestris*). *Nature*, 154, 679–80, 1944.

Howard, Alexander L. The yew tree (*taxus baccata*). *Nature*, 154, 215–16, 1944.

Jacob, H. E. Six thousand years of bread. Its holy and unholy history. xv+399 p., 8 pls. Garden City, N. Y., Doubleday, Doran, 1944.

Reviewed by NORAH J. WATTS, *Nature*, 154, 501–02, 1944.

Marcus, Margaret Fairbanks. The herbal as art. *Bulletin of the Medical Library Association*, 32, 376–84, 4 figs., 1944.

[Pollen Analysis Circular]. Typewritten circular edited by Professor PAUL BIGELOW SEARS, Department of Botany, Oberlin College, Oberlin, Ohio. No. 1, 4 p., May 5, 1943. Latest issue seen, no. 7, 6 p., July 1, 1944.

This circular which will probably become a new review under the title "Pollen and spore science circular" is mentioned here to illustrate the increasing interrelationship between different sciences. Pollen science implies the cooperation of botanists with geologists, palaeontologists, archaeologists. These pollen scientists are scattered in many countries, the leader being the Swede, GUNNAR ERDTMAN, whose book, "Introduction to pollen analysis," was recently published by the Chronica Botanica Press (256 p., Waltham, Mass., 1943). The circulars already published were kindly communicated to me by Prof. A. ORVILLE DAHL of the University of Minnesota. G. S.

Rendle, Alfred B. A biographical index of deceased British and Irish botanists. Second edition, xxii+342 p. London, Taylor and Francis, 1931.

Russell, Sir E. John. British agricultural research: Rothamsted. 32 p., illus. London, British Council, 1942.

"The famous institution described in this volume is generally regarded as the senior of all agricultural research institutions. Its founder, Sir JOHN LAWES, made one of the greatest innovations in agricultural science, the invention of soluble phosphate fertilizers. Without this discovery, Britain and the industrial countries of Western Europe could not have supported the dense populations that grew up during the nineteenth century. LAWES devoted his life and estate to agricultural research. The institution that he founded has grown steadily, and never faster than in recent years. To-day it possesses many fine laboratories, where workers from all parts of the world come to learn and discover."

Salaman, Redcliffe N. The influence of the potato on the course of Irish history. 32 p. (The tenth Finlay Memorial Lecture). Dublin, Browne and Nolan, 1944.

The potato saved the Irish people from extermination after the Elizabethan wars and again after the Cromwellian war. But later, by stabilizing the masses at the lowest standard consistent with existence, it gradually rendered them indifferent to misfortune. The oversimplification of a potato-ridden economy robbed them of effective defence against oppression. Bibliography. C. W. A.

Schopfer, William Henri. Plants and vitamins. Authorized translation by NORBERT L. NOECKER. Foreword by W. J. ROBBINS. xiv+300 p. (A new series of plant science books, II). Waltham 54, Mass., Chronica Botanica, 1943.

Sigerist, Henry E. American truffles. A Thanksgiving fantasia. *Bulletin of the History of Medicine*, 16, 402–09, 1944.

Sparn, Enrique. Bibliografía de la Yerba mate (*Ilex paraguayensis St.-Hil.*). 20 p. (Republ. Argentina Acad. Nac. Ciencias Miscel., 22). Córdoba, 1937.

Thompson, James Westfall. A history of livestock raising in the United States, 1607–1860. 182 p. (Agricultural History Series, no. 5). Washington, U. S. Dept. of Agriculture, 1942.

Reviewed by CONWAY ZIRKLE, *Isis*, 35, 195, 1944.

29. ZOOLOGY

Beltrán, Enrique. El problema de las clasificaciones zoológicas y la enseñanza de la zoología. *Revista de la Sociedad Mexicana de Historia Natural*, 5, 83–97, 1944.

Eitrem, S. Der Skorpion in Mythologie und Religionsgeschichte. *Symbolae Osloenses*, 7, 53–82, 6 figs., 1928.

Friedman, Reuben. Biology of acarus scabiei. xiii+183 p., 112 illus. New York, Froben Press, 1942.

Gudger, E. W. The earliest winged fish-catchers. *Scientific Monthly*, 59, 120–29, 13 figs., 1944.

Gudger, E. W. Fishes that play "leapfrog." *American Naturalist*, 78, 451–63, 1 fig., 1944.

Gudger, E. W. Fishes that swim heads to tails in single file. *Copeia*, 152–54, September, 1944.

Gudger, E. W. Two fishing cats that made history. *Natural History*, 53, 371–74, illus., 1944.

Nicol, Hugh. Biological control of insects. 173 p., 8 pls. Harmondsworth, Middlesex, England, Penguin Books, 1943.

Reviewed in *Nature*, 152, 399, 1943. Historical notes throughout. C. W. A.

Palmer, T. S. The Deane collection of portraits of ornithologists — the development of an idea. *Science*, 100, 288–90, 1944.

Sarton, George. Query no. 108. Fishing with otters. *Isis*, 35, 178, 1944.

Stephenson, T. A. Seashore life and pattern. 28 p., 16 pls., 9 figs. London, King Penguin Books, 1944.

A charming little book, the core of which is a collection of 16 colored plates representing marvels of the sea shore, such as feather-stars, fan-worms, anemones, periwinkles. The author, professor of zoology in the University of Wales, has been painting seashore and other subjects for thirty-five years. He is thus well qualified to speak of art and science. G. S.

V. SCIENCES OF THE EARTH

(implying knowledge of both organic and inorganic nature)

31. Geography and Oceanography

Baião, António; Cidade, Hernani; Múrias, Manuel (editors). História da expansão portuguesa no mundo. 2 vols. quarto. 392 p., 384 p., pls. Lisboa, Editorial Atica, 1937–39.

History of Portuguese colonization from the mediaeval beginnings on. Introduction. Part I, Morocco. Part II, Atlantic Ocean. Parts III and IV (in vol. 2) deal, respectively, with India and the Far East, and with the New World. The account written by specialists is illustrated with admirable reproductions of portolani, maps, portraits, engravings, paintings, and other monuments. Table of contents but no indices. G. S.

Bowman, Isaiah. Commanding our wealth. *Science*, 100, 229–41, 1944.

Address of the retiring president, American Association for the Advancement of Science, Cleveland, Ohio, September 11, 1944.

Fitzgerald, Walter. Progress in geographical method. *Nature*, 153, 481–83, 1944.

Historical outline from Montesquieu, 1748, to present day. C. W. A.

Wroth, Lawrence C. The early cartography of the Pacific. *Papers of the Bibliographical Society of America*, 38, 87–268, 22 pls., 1944.

Contents: 1. Before the great discoveries; 2. The period of the great discoveries; 3. The hypothetical Pacific; 4. The Pacific becomes a reality; 5. The Pacific is given bounds; 6. The false continent, Terra Australis; 7. New Guinea and the Solomons; 8. The Dutch explorations and the mapping of Australia; 9. Japan, the shuttlecock of the cartographers; 10. The Russian discoveries.

32. Geology, Mineralogy, Palaeontology, Mining

(For Palaeobotany, Palaeozoology, and Palaeoanthropology, see, respectively, 28, Botany, 29. Zoology, and 39. Prehistory)

Ewald, P. P. International status of crystallography, past and future. *Nature*, 154, 628–31, 1944.

Oliveira Machado e Costa, Alfredo A. de. A cultura mineralógica dos clássicos portugueses. *Petrus Nonius*, 5, 133–44, 1944.

33. Meteorology, Climatology, Terrestrial Physics

Oliveira Boléo, José de. Aspectos do estudo das variações climatológicas. *Petrus Nonius*, 5, 74–82, 3 figs., 1944.

Tannehill, Ivan Ray. Hurricanes. 2nd ed. x+265 p., maps. Princeton, Princeton University Press, 1942.

Reviewed by Conway Zirkle, *Isis*, 35, 195–96, 1944.

VI. ANTHROPOLOGICAL AND HISTORICAL SCIENCES

(Knowledge of man, past and present)

34. Anatomy

Alston, Mary Niven. The attitude of the Church toward dissection before 1500. *Bulletin of the History of Medicine*, 16, 221–38, 1944.

"We have evidence that in Italy dissection began earlier than 1240, at Montpellier by 1340 at the latest, and in France proper probably prior to 1400, certainly by 1407. We have no testimony that anatomy was hindered in Italy at any time, unless the prohibition against boiling be taken as a hindrance. But Guy de Chauliac, a papal chaplain, did not interpret it that way. At Paris a prohibition of anatomy is mentioned, but by 1407 a postmortem is being performed on a prominent ecclesiastic. On the other hand, there is no evidence that dissections were allowed to be carried on wholesale. Permissions were for one or two a year. It could perhaps be argued that authorities, ecclesiastical and lay, were very conservative on that subject. But it would be too partisan to argue that there was therefore a deliberate policy of discouragement, as it would be too partisan to argue that there was a policy of aiding anatomical science. In France and Italy the autopsy seems to have smoothed the way for the teaching of anatomy. Certainly by 1500 in both countries the dissection of the human body was established."

Faldini, Julio. El renacimiento anatómico. *Anales de la Sociedad Peruana de Historia de la Medicina*, 6, 49–66, 1944.

Jones, Frederic Wood. Structure and function as seen in the foot. iv+329 p. London, Baillière, Tindall and Cox, 1944.

Reviewed by J. D. BOYD, *Nature*, 154, 253–54, 1944.

Krogman, Wilton Marion. Morphology in ancient times, p. 1878–83, figs.; Morphology during the Renaissance, p. 1884–93, figs.; Morphology in modern times, p. 1894–1904, figs. *Ciba Symposia*, 6, 1944.

35. PHYSICAL ANTHROPOLOGY (*Anthropometry and Races of Man*)

Lowie, Robert H. American contributions to anthropology. *Science*, 100, 321–27, 1944.

Mitra, Panchanan. A history of American anthropology. x+239 p., frontispiece. University of Calcutta, 1933.

Contents: Introduction; 1. Proto-anthropological period — contributions of New Spain; 2. Proto-anthropological period — the English and French travellers and explorers — 1620–1783; 3. Early scholarship and general interest in the science of the American Indian — collector and connoisseur ideals — 1783–1864; 4. Physical anthropology, philology and archaeology as growing schools of thought prior to the Civil War — Learned society and academic efforts; 5. LEWIS H. MORGAN: "The TYLOR of American anthropology"; 6. POWELL, the research leader; PUTNAM, the museum builder; and BRINTON, the academician, and their schools at Washington, Boston and Philadelphia, museum methods; 7. Noted expeditions; 8. New methods and research concepts in the twentieth century. The great synthetic schools; 9. Collections and museums, societies and academies; 10. History of anthropology as a culture trait in modern America. The frontispiece is a portrait of CLARK WISSLER, the whole book being a *guru-dakshina* to him. Bibliography (p. 213–34). G. S.

36. PHYSIOLOGY (*human and comparative*)

Graubard, Mark. Man's food, its rhyme or reason. x+213 p. New York, Macmillan, 1943.

Reviewed by CONWAY ZIRKLE, *Isis*, 35, 196–97, 1944.

Olmsted, J. M. D. Historical note on the *noeud vital* or respiratory center. *Bulletin of the History of Medicine*, 16, 343–50, 1944.

Olmsted, J. M. D. Physiology as an independent science. Science in the University, 293–303, University of California Press, 1944.

Peller, Sigismund. Studies on mortality since the Renaissance. *Bulletin of the History of Medicine*, 16, 362–81, 1944.

37. PSYCHOLOGY (*human and comparative*)

Martí Ibáñez, Félix. Notas e informaciones psicoanalíticas. Psicoanálisis del ajedrez. *Revista de Psicoanálisis*, 187–97, 1944.

Psychoanalytic study of the game of chess. The final section deals with the famous chessplayer PAUL MORPHY (New Orleans, 1837–1884).

Zilboorg, Gregory. Historical sidelights on the problem of delinquency. *American Journal of Psychiatry*, 100, 757–61, 1944.

41. SUPERSTITION AND OCCULTISM

Grosser, Felix. Ein neuer Vorschlag zur Deutung der sator-Formel. *Archiv für Religionswissenschaft*, 24, 165–69, 1926.

For other Sator-arepo notes, see *Isis*, 35, 178, and below under KRAELING. G. S.

Kraeling, Carl H. The sator acrostic. *Crozer Quarterly*, 22, 28–38, 1945.

Weiss, Harry B. Oneirocritica Americana. The story of American dream books. 37 p., frontispiece. (Reprinted from the *Bulletin of the New York Public Library*, June–July, 1944). New York, New York Public Library, 1944

Preliminary check list of dream books published in America with an introduction giving a brief history of dream books elsewhere. Inasmuch as the author speaks of Babylonian writings, he might have referred also to the very remarkable Egyptian textbook of the XIIth Dyn. (c. 2000–1790 B.C.) edited by ALAN H. GARDINER in 1931 (*Isis*, 25, 476–78). Some of the American dream books were printed in German, Polish, Greek. As I explained it in my preface to JAFFE's *Men of Science in America*, the study of the superstitions flourishing in America should prevent us from being too proud of the scientific achievements of a very small minority; moreover, in order to cure a disease we must first investigate it. It is not a rare disease but a dangerous epidemic. According to MAURICE ZOLOTOW (1943), there are about 80,000 full-time fortunetellers in the U. S. who collect from their clients almost $200,000,000 a year! It is a pity those 80,000 crooks cannot be sent to the front; they are expendable. G. S.

43. SOCIOLOGY, JURISPRUDENCE AND POSITIVE POLITY

Bryson, Lyman; Finkelstein, Louis; MacIver, Robert M. (editors). Approaches to world peace. Fourth symposium. xviii+973 p. New York, Harper, 1944.

This is the fourth of the symposia organized by LOUIS

FINKELSTEIN and the Conference on Science, Philosophy and Religion. Vols. 1 to 3 appeared in 1941, 1942, 1943 and can be bought at the offices of that Conference (3080 Broadway, New York City). The present volume is chiefly concerned with the peace and the establishment of a better world. It includes no less than 59 contributions by leaders in many fields. Remarkable examples are given on p. 829 of political results obtained without planning or in spite of planning; it does not follow that planning is not necessary but rather that being human it can never be complete and perfect. Man proposes but God disposes.

G. S.

[HUXLEY, J. S. and others]. Reshaping man's heritage. Biology in the service of man. By J. S. HUXLEY, H. G. WELLS, J. B. S. HALDANE, W. G. OGG, J. C. DRUMMOND and W. F. CRICK, J. W. MUNRO and J. FISHER, W. H. KAUNTZE, L. J. WITTS, P. G. EDGE, J. M. MACKINTOSH, Sir E. V. APPLETON. 96 p., 7 pls. London, Allen and Unwin, 1944.

Reviewed by T. H. HAWKINS, *Nature*, 154, 39–40, 1944.

Roback, A. A. A dictionary of international slurs (ethnophaulisms). With a supplementary essay on aspects of ethnic prejudice. 394 p. Cambridge, Mass., Sci-Art Publishers, 1944 ($6.25).

This is a very interesting book for the sociologist and especially for the student of international relationships. As the author remarks himself, it is not always easy to say whether an expression is meant as a slur or not. The phrase "French novel" may be an objective description, or it may be a slur; it depends on the speaker's intention. The collection, derived from many languages, is very rich and might be almost endlessly enriched, but it is more than sufficient for the purpose in view. The book is completed with a valuable list of dictionaries and of paroemiological collections.

G. S.

44. HISTORY OF CIVILIZATION

(*General history, Historical methods, Biography, Chronology*)

Butler, Pierce. Scholarship and civilization. 34 p. Graduate Library School, University of Chicago, 1944.

"This pamphlet outlines the introductory section of a course in the History of Scholarship that is given at the Graduate Library School of the University of Chicago. It is intended: (1) To serve as a classroom syllabus until a more adequate manual can be prepared. (2) To invite criticisms and suggestions that will aid in the preparation of such a manual."

Parker, Donald Dean. Local history. How to gather it, write it, and publish it. Revised and edited by BERTHA E. JOSEPHSON. xiv+186 p. Social Science Research Council [1944] (no place, no date).

From the Preface by CHRISTOPHER B. COLEMAN: "The study and writing of local history receives attention from three classes of people: students, teachers, and adults not connected with educational institutions. Each of these has its own approach. For the first, local history is an excellent, but too litttle used, introduction to the whole field of history. It affords contact with original, primary sources of information, it calls for exploration and discovery in untrodden areas, and it prevents the misconception that history is merely something already written in books. For teachers it offers the opportunity, also, of putting scientific training to the service of the community and of avoiding the endless repetition of stale information. To men and women not connected professionally with schools, it presents an excellent field for the exercise of a lively intellectual curiosity, and provides a safeguard against the leadership of ignorance; it gives the individual, humble or noted, a place in the development of knowledge and wisdom. Professional historians are critical of the product of nonprofessional study of local history, often justly so. Its defects, however, are due in part to defective training received in schools and in part to the failure to grasp the importance of widespread work in local history. The appearance of guides for the amateur local historian, the multiplication and growth of historical societies, and the establishment of higher standards for publication are remedying the first of these evils. The importance of more widespread study of local history needs emphasis."

46. HISTORY OF LANGUAGE, WRITING, AND LITERATURE

Yule, G. Udny. The statistical study of literary vocabulary. ix+306 p. Cambridge, University Press; New York, The Macmillan Co., 1944 ($6.00).

The author of what from the first has been the best book on general statistics, *An Introduction to the Theory of Statistics*, Mr. G. UDNY YULE, has in the present volume produced a pioneer work. Can judgments of style and of authorship be impersonally tested by statistical methods? Mr. YULE tried to find out in the case of the *De Imitatione Christi*. What is the probability that THOMAS À KEMPIS wrote that work or not? His authorship has been disputed. What evidence, one way or the other, does the application of statistical methods yield upon that point? The evidence is favorable to the authorship of THOMAS À KEMPIS. Taking the works of such authors as MACAULAY, BUNYAN, GERSON, and THOMAS À KEMPIS, Mr. YULE gives a detailed exposition of the method of handling the data in a manner best calculated to arrive at a sound conclusion. A good knowledge of high-school algebra is necessary for a great part of the book, and something a little more than that for some parts of the book. The non-mathematical reader will find the book difficult but interesting going. As Mr. YULE indicates, statistical analysis can only balance the claims of one author against another. In cases of disputed authorship the method here developed should prove very useful. Mr. YULE, as usual, writes with great clarity and charm. What he has begun in this volume others will take up and complete; meanwhile the present study will for long represent the standard, and will always remain the classical work on the subject.

M. F. A. M.

47. History of Morals
(*Moral organization of society*)

Eby, Louise Saxe. The quest for moral law. 284 p. New York, Columbia University Press, 1944.

Professor Eby's contribution is a significant one in naturalistic philosophy, in which the attempt is made to apply the methods of science to humanistic problems such as ethics. The first part of her volume gives a systematic and comprehensive survey of classic ethical systems. The second part considers the problems involved in "making ethics a science." Doctor Eby's effort well illustrates the difficulties involved with inadequate appreciation of the data available. Adequately to utilize the findings of modern science in philosophical synthesis, it is not enough merely to rely on popularizations of scientific findings. C. D. L.

48. History of Philosophy
(*See also above*, 18. Philosophy of Science)

Clarke, F. P.; Nahm, M. C. (editors). Philosophical essays in honor of Edgar Arthur Singer, Jr. Philadelphia, University of Pennsylvania Press, 1942.

Reviewed by George D. W. Berry, *Isis*, 35, 197–98, 1944.

Krikorian, Yervant H. Naturalism and the human spirit. x+397 p. New York, Columbia University Press, 1944.

This volume contains a series of essays which offer a fair summary of the position of naturalistic philosophy in America. The basis for this important philosophical effort derives from the attempt of John Dewey and his pupils to apply the scientific experimental method to the study of all forms of human activity. The opening essay, by John Dewey, "Antinaturalism *in extremis*," is a vigorous attack on supernaturalism and antinaturalism. The concluding essay, "The Nature of Naturalism," by John Herman Randall, Jr., summarizes the points of view of the various authors. There is emphasized throughout the essential unity of nature, implying a denial of such metaphysical dualisms as "mind" and "body." Included among the essays are "Naturalism and Religion," by S. P. Lamprecht; "Naturalism and Democracy," by Sidney Hook; "Naturalism and Ethical Theory," by Abraham Edel; "A Natural History of the Aesthetic Transaction," by Eliseo Vivas; "The Unnatural," by H. W. Schneider; "The History of Philosophy," by George Boas; "The Materials of Historical Knowledge," by E. W. Strong; "Naturalism and the Sociological Analysis of Knowledge," by T. Z. Lavine; "Logic without Ontology," by E. Nagel; "A Naturalistic View of Mind," by Y. H. Krikorian; "The Categories of Naturalism," by W. R. Dennes; "The Naturalism of Frederick Woodbridge," by H. T. Costello, and "Naturalism in America," by Harold A. Larrabee. C. D. L.

Lepley, Ray. Verifiability of value, ix+267 p. New York, Columbia University Press, 1944 ($2.25).

Naturalistic philosophy in America, developed largely by John Dewey and his pupils, asserts that the experimental approach is capable of extension to all human interests and their interrelations. Doctor Lepley skillfully defends his thesis that "the central implication of the developing experimental viewpoint is that values — moral values as well as scientific facts — are suggestions relatively verified and therefore in some sense and degree verifiable." Important for the study of a scientific basis for ethics is his differentiation between the descriptive and the normative formulation of conduct and motive. The volume is an excellent plea for experimentation in all forms of human endeavor with the scientific experimental method. It has a useful bibliography. C. D. L.

Rawlins, F. I. G. Adventures in phenomenology. *Nature*, 154, 504–06, 1944.

49. History of Religion (*Science and Religion*)

Braunstein, Baruch. The Chuetas of Majorca. Conversos and the Inquisition of Majorca. xvi+227 p. (Columbia University Oriental Series, 28). Scottdale, Pa., Mennonite Publishing House, 1936.

The main part of this book "deals with the activities of the Majorcan Inquisition in relation to the Conversos — to those Jews who embraced Christianity, and to their descendants. It is a study based upon a first-hand and an extensive examination of a large number of original documents, in the form of inquisitorial processes and manuscripts which, for the most part, are being revealed to the public for the first time." Thanks to the zeal of Raymond of Penafort (XIII–1), the inquisition began in Majorca in 1232, a year before the foundation of the Mediaeval Inquisition (1233). The last Converso was condemned in 1720 but the inquisition existed with interruptions until 1834; what is worse, social ostracism continued with such intensity that the descendants of the Conversos, the so-called Chuetas, constitute a class of pariahs in Majorca to this day. The painful facts revealed by the author might have seemed obsolete a few years ago, but Nazi bestiality has given them a new interest. G. S.

Dittrick, Howard. Ex votos of medical interest. *Bulletin of the Medical Library Association*, 32, 345–55, 7 figs., 1944.

Francis, Henry Sayles. Traditional representation of medicine and healing in the Christian hierarchy. *Bulletin of the Medical Library Association*, 32, 332–44, 5 figs., 1944.

Little, A. G. Franciscan papers, lists, and documents. xiii+262 p. (Publications of the University of Manchester, no. 284; Historical series, no. 81). Manchester, Manchester University Press, 1943.

Reviewed by R. C. Petry, *American Historical Review*, 49, 699–700, 1944.

VII. MEDICINE

50. History, Organization, and Philosophy of Medicine

[American Physicians Art Association]. Seventh annual exhibition of the American Physicians Art Association. Grand Ballroom, Stevens Hotel, Chicago, Illinois, June 12 to 16, 1944. 32 p. Evansville, Indiana, Mead Johnson & Co., 1944.

Ascoli, Alberto. Random thoughts with a hopeful purpose. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 32–42, Baltimore, 1944.

Notes on the history of bacteriology.

Beltran, Juan Ramon. La historia de la medicina y el perfeccionamiento médico. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 43–47, Baltimore, 1944.

Born, Wolfgang. The nature and history of medical caricature. *Ciba Symposia*, 6, 1910–24, illus., 1944.

[Castiglioni, Arturo]. Essays in the history of medicine presented to Professor Arturo Castiglioni on the occasion of his seventieth birthday, April 10, 1944. vi+358 p., portr., figs. (Supplements to the *Bulletin of the History of Medicine*, no. 3). Baltimore, Johns Hopkins Press, 1944. $3.50.

The contents of this admirable Festschrift are analyzed in this Critical Bibliography, each item being placed where it belongs. It was edited by Dr. Sigerist who contributed a moving *Epistola dedicatoria*, and it includes a portrait, bibliography, and brief biography. This Festschrift is superior to most of them in that it is well indexed. Our every good wish to the jubilarian for many more years of health and fruitful work. G. S.

Eckman, James; Bigelow, Charles E. History of medicine in Dodge County. 87 p. From the History of Science Seminar (Eckman) of Richard E. Scammon, Graduate School, University of Minnesota, Minneapolis (received, August 1944).

Elaborate study of medicine in Dodge County in SE Minnesota, with a number of biographical sketches and 395 references. G. S.

Foote, Helen S. Silver in the service of medicine. *Bulletin of the Medical Library Association*, 32, 369–75, 5 figs., 1944.

Garrison, Fielding H. A medical bibliography. A check-list of texts illustrating the history of the medical sciences. Originally compiled by the late Fielding H. Garrison, and now revised, with additions and annotations, by Leslie T. Morton. vii+412 p. London, Grafton, 1943.

Reviewed by Julia E. Wilson, *Bulletin of the History of Medicine*, 16, 94–96, 1944.

Gordon, Benjamin Lee. The romance of medicine: the story of the evolution of medicine from primitive times and occult practices. xii+624 p., 147 ills. Philadelphia, Davis, 1944.

Reviewed by E. H. Ackerknecht, *Bulletin of the History of Medicine*, 15, 549–50, 1944.

Greenwood, Major. Authority in medicine: old and new. 32 p. (The Linacre Lecture, 6 May 1943). Cambridge, University Press, 1943.

On the methodology of modern medical research, with backward glances at Galen and Thomas Linacre.
C. W. A.

Haagensen, C. D.; Lloyd, Wyndham E. B. A hundred years of medicine. xii+444 p. New York, Sheridan House, 1943.

Reviewed by Helen Clapesattle, *American Historical Review*, 49, 455, 1944.

Leonardo, Richard A. American surgeon abroad. xv+235 p., 20 pls. New York, Froben Press, 1943.

Chatty account of the author's postgraduate studies in Europe, with excellent photographs, some of them contributed by Dr. Victor Robinson, others being portraits of leading European surgeons given to the author. Recommended to young doctors. G. S.

Leonardo, Richard A. History of surgery. xvii+504 p., 100 pls. New York, Froben Press, 1943.

Martí Ibáñez, Félix. Impresiones del X Congreso internacional de historia de la medicina. *Revista de Información Terapéutica*, 711–26, Barcelona, 1938.

Martí Ibáñez, Félix. Los milagros curativos en la historia de la medicina. "Nueva Era," 5–26, Barcelona, 1937.

Munro, Thomas. Art and medicine in ancient and primitive cultures. *Bulletin of the Medical Library Association*, 32, 304–17, 6 figs., 1944.

Proskauer, Curt. The dentist in caricature. *Ciba Symposia*, 6, 1933–47, illus., 1944.

Pulido Méndez, Manuel Antonio. Precedentes en la historia de la medicina peruana. *Anales de la Sociedad Peruana de Historia de la Medicina*, 6, 103–07, 1944.

Ricci, James V. The genealogy of gynaecology. History of the development of gynaecology throughout the ages, 2000 B.C.–1800 A.D. 578+xxi p., ill. Philadelphia, Blakiston, 1943.

Reviewed by O. Temkin, *Bulletin of the History of Medicine*, 16, 422–24, 1944.

Sigerist, Henry E. Civilization and disease. xi+255 p., ill. Ithaca, N. Y., Cornell University Press, 1943.

Reviewed by Iago Galdston, *Isis*, 35, 220, 1944.

Sigerist, Henry E. Classics of medicine. *Bulletin of the History of Medicine*, 16, 1–12, 1944.

Weinberger, Bernhard Wolf. An early record of the use of the caduceus in America. *Bulletin of the History of Medicine*, 16, 410–13, 2 figs., 1944.

51. Epidemiology. History of Special Diseases. Medical Geography. Public Health. Balneology. Social Medicine

Cohen, Herbert G. Rat bite fever. Contributions to its history and war significance. *Bulletin of the History of Medicine*, 16, 108–15, 1944.

Durán, Carlos Martínez. Locos de la Colonia. La paranoia del Visitador Francisco Gómez de la Madrid y la psicosis palúdica del Fiscal de la Audiencia don Sebastián de Becerra y Gutiérrez. *Anales de la Sociedad Peruana de Historia de la Medicina*, 61, 69–89, 1944.

Friedman, Reuben. Scabies — civil and military. Its prevalence, prevention and treatment. xviii+288 p. New York, Froben Press, 1941.

Jarcho, Saul. Contemporary tendencies in the history of malariology. *Bulletin of the History of Medicine*, 16, 389–98, 1944.

Luisada, Aldo A. A short chronology of important events in cardiology. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 152–60, Baltimore, 1944.

Magnus-Levy, Adolf. Diabetikerdiäten der Vorinsulinära. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 161–69, Baltimore, 1944.

Martí Ibáñez, Félix. Historia de la sífilis. I. Realidad y leyenda. II. Métodos de tratamiento. 10 p., ills. *El Farmaceutico* (received Dec. 1944).

Martí Ibáñez, Félix. Preludio a la historia de la sífilis. *Revista Argentina de Historia de la Medicina*, v. 3, no. 3, 37–72, 1944.

Rosen, George. The history of miners' diseases: a medical and social interpretation. With an introduction by Henry Sigerist. xii+490 p., 17 pls. New York, Schuman's, 1943.

Reviewed by F. J. Cole, *Nature*, 154, 161–62, 1944, and by Alice Hamilton, *Science*, 100, 429–30, 1944.

Schwartz, Louis Laszlo. Early concepts of dental caries in America. *Bulletin of the History of Medicine*, 16, 246–60, 1944.

Vargas, Luis. Algunos de los hechos más salientes en la historia del paludismo. *Revista de la Sociedad Mexicana de Historia Natural*, 5, 1–23, 1 pl., 1944.

52. History of Hospitals, of Medical Teaching, and of the Medical Profession

Chesney, Alan M. The Johns Hopkins Hospital and The Johns Hopkins University School of Medicine. A Chronicle. Foreword by William H. Howell. Volume I, Early years, 1867–1893. xviii+318 p., ills. Baltimore, Johns Hopkins Press, 1943.

Reviewed by Genevieve Miller, *Bulletin of the History of Medicine*, 16, 90–92, 1944.

Durán, Carlos Martínez. Los hospitales de América durante la época colonial. Essays in the History of Medicine presented to Prof. Arturo Castiglioni, 170–83, 4 figs., Baltimore, 1944.

Jensen, Deborah MacLurg. A history of nursing. 310 p. St. Louis, Mosby, 1943.

Reviewed by Victor Robinson, *Bulletin of the History of Medicine*, 16, 92, 1944.

Jones, Tom. The graphic arts in medical education. *Bulletin of the Medical Library Association*, 32, 385–90, 1944.

Stewart, Isabel Maitland. The education of nurses. 399 p. New York, Macmillan, 1943.

Reviewed by Victor Robinson, *Bulletin of the History of Medicine*, 16, 93, 1944.

Teleky, Ludwig. Certifying surgeons — examining surgeons, a century of activity (Great Britain 1844–1944). *Bulletin of the History of Medicine*, 16, 382–88, 1944.

53. Pharmacy. Pharmacology. Toxicology

Fox, Charles L., Jr. Sulfonamides in the treatment of war wounds and burns. *Annual Report*

of the Smithsonian Institution for 1943, 569–74, 1944.

Loomis, C. Grant. Lapidary medicine. *Bulletin of the History of Medicine*, 16, 319–24, 1944.

Milliken, William M. Majolica drug jars. *Bulletin of the Medical Library Association*, 32, 293–303, 7 figs., 1944.

Urdang, George. How chemicals entered the official pharmacopoeias. *Pharmaceutical Archives*, 15, 17–37, 6 figs., 1944.

Urdang, George. College of Pharmacy associations. *American Journal of Pharmaceutical Education*, 333–39, 1944.

Urdang, George. The development of the pharmaceutical textbook. A synopsis. *American Journal of Pharmaceutical Education*, 328–33, 1944.

Urdang, George. The place of Latin in the official standards of pharmacy. *Bulletin of the National Formulary Committee*, 12, 201–20, 1944.

One of the strongest arguments for Latin terminology in pharmaceutical usage is international uniformity. Alas! that uniformity does not exist. Latin terms vary from age to age and from country to country. E.g., there are great variations in strength of official acids with identical Latin titles. The author concludes: "The practice of pharmacy of today has other and more important fundamentals than the artificial maintenance of artificial Latinized names for drugs."

Urdang, George. Retail pharmacy as the nucleus of the pharmaceutical industry. Essays in the History of Medicine presented to Prof. ARTURO CASTIGLIONI, 325–46, 4 figs., Baltimore, 1944.

Weintraub, Robert L. Chemotherapeutic agents from microbes. *Annual Report of the Smithsonian Institution* for 1943, 545–68, 5 pls., 1944.

VIII. EDUCATION. (*Methods of accumulating, imparting, and diffusing knowledge*)

54. EDUCATION (*Generalities, Methods, Colleges, Universities*)

Ortega y Gasset, José. Mission of the University. Translated, with an introduction, by HOWARD LEE NOSTRAND. 103 p. Princeton, Princeton University Press, 1944 ($2.00).

JOSÉ ORTEGA (b. 1883) was from 1911 to 1936 professor of metaphysics in Madrid. He achieved international recognition in 1930 with his book, *La rebelión de las masas*, and wrote the pamphlet now translated in the same year in order to develop an address given at the request of the Federación Universitaria Escolar of Madrid. He has often been called a Father of the Republic and his influence was considerable from 1930 to 1936; soon after the outbreak of the Civil War he was obliged to go to Paris and undergo a serious operation; then he moved to Holland, Portugal, Argentina. In 1942 he returned to Portugal. He has been deeply influenced by WILHELM DILTHEY; he is very individualistic and had caused much enthusiasm for his ideas and against them because of his fiery personality and his paradoxical and aggressive attitude. He is in the main a conservative, left center, a defender of the best traditions and the humanities not against science but on the side of it; he fights for poetry and rationalism, against the narrow positivism which darkened the beginning of this century and helped to bring about the war period. NOSTRAND has added an enlightening introduction to this provocative little book. G. S.

56. BIBLIOGRAPHY (*Methods, Libraries*)

Ballard, James. A catalogue of the medieval and Renaissance manuscripts and incunabula in the Boston Medical Library. xx+246 p., figs. Boston, Privately Printed, 1944.

Reviewed by GEORGE SARTON, *Isis*, 35, 218, 1944.

58. CATALOGUES OF SECOND-HAND BOOKS ON THE HISTORY AND PHILOSOPHY OF SCIENCE

Many catalogues of second-hand books are so interesting and so full of valuable information that we register them in this section, together with other lists of a similar nature, such as catalogues of scientific medals and prints. When applying to the publishers of these catalogues for a copy, please mention *Isis*.

[**Baer, E.**]. No. 9. General catalogue of books, prints, autograph letters. 650 items. London, N.W. 2, 134 Ashford Court, (received Dec. 1944).

[**Bamberger & Wahrman**]. Catalogue no. 30. Judaica, containing the library of the late V. APTOWITZER and several other collections. 132 p., 2313 items. Jerusalem, Hassolel Street 5, 1944.

[**Cambridge Book House**]. List no. 39. Books on medical and scientific history. 200 items. Paterson 4, N. J., 612 Fourteenth Ave. (received Oct. 1944).

[**Cambridge Book House**]. List no. 40. Books on medical and scientific history. 200 items. Paterson 4, N. J., 612 Fourteenth Ave. (received Dec. 1944).

[**Campbell, William J.**]. No. 68. A catalogue of books. 942 items. Philadelphia 3, 2045 Locust St. (received Nov. 1944).

[**Davis & Orioli**]. Catalogue 117. Old and rare books. 48 p., 671 items. London, W.1, 56, Maddox St. (received Nov. 1944).

[**Fiedler, Henry George**]. Catalogue no. 95. Catalogue of scientific periodicals and publications of learned societies. 714 items. New York 3, 31–33 E. 10th St., 1944–45.

[**Grant, John**]. A catalogue of books. 74 p., 2109 items. Edinburgh, 1, 31 George IV Bridge, October 1944.

[**Grant, John**]. A catalogue of books: American history and travel; Economics and social history; Highland, Gaelic and Irish; Philology, texts and dialects; General English literature; Standard literary sets. Edinburgh 1, 31 George IV Bridge, October 1944.

[**Heffer, W.**]. List no. 609. Second-hand books. With selections from the libraries of the late A. A. Tilley and F. M. Cornford, and Books on bibliography and printing from the library of R. E. Thomas. 3880 items. Cambridge, England, 1944.

[**Heller, F. Thomas**]. List no. 32. Early Science and medicine. 64 items. New York 14, 82 Jane St., 1944.

[**Heller, F. Thomas**]. List no. 33. Early science and medicine. 67 items. New York 14, 82 Jane St., 1944.

[**Heller, F. Thomas**]. List no. 34. Early science and medicine. 121 items. New York 14, 82 Jane St., December 1944.

[**Hoosier Bookshop**]. List no. 110. Americana. Medicine. Miscellaneous. 217 items. Indianapolis 2, Indiana, 2135 North Alabama (received Sept. 1944).

[**Johnson, Walter J.**]. Catalogue 13. Graphic and fine arts, archaeology, Greek and Roman literature. 362 items. New York 10, 125 E. 23rd St., 1944.

[**Johnson, Walter J.**]. Catalogue 14. Russia and border states, from the Baltics to the Balkans. Including also Central Asia, the Levant and Turkey. 268 items. New York 10, 125 E. 23rd St., 1944.

[**Kraus, H. P.**]. Catalogue 35. A magnificent collection of Russian sets and periodicals in fine bindings, partly originating from former Imperial Russian libraries. 66 p., 348 items. New York 22, 64 E. 55th St. (received Sept. 1944).

[**Kraus, H. P.**]. List no. 50. Periodical publications of Swiss Societies in the field of natural, military, and social sciences, music, etc. 9 items. New York 22, 64 E. 55th St. (received October 1944).

[**Kraus, H. P.**]. List no. 56. Books printed in or relating to America. 300 items. New York 22, 64 E. 55th St. (received Dec. 1944).

[**Kraus, H. P.**]. List no. 57. Bibliography & reference works, including books on graphic art & periodicals, with a special section, history of German newspapers. 206 items. New York 22, 64 E. 55th St. (received Dec. 1944).

[**Krause, Friedrich**]. Catalog no. 27. 32 p. New York 33, 851 W. 177th St., 1944–45.

[**Low, David**]. Catalogue 55. Mainly English literature. 682 items. London, W.C.2, 17, Cecil Court (received August 1944).

[**Mathews, Alister**]. Catalogue 22. 1448 items. Clooney Beg, Swanage (Dorset), England, Autumn 1944.

[**Old Hickory Bookshop**]. Catalogue no. 79. Medical & scientific books — pamphlets — autographs. 58 p., 820 items. New York 3, 65 Fifth Ave. (received Dec. 1944).

[**Ranschburg, Otto H.**]. Catalogue no. 5. French, Italian, Spanish literature. 80 p., 480 items. New York 19, 200 W. 57th St. (rec'd Oct. 1944).

[**Rosenthal, A.**]. Catalogue 7. Rare and unusual books on many subjects. Including important sections on English history and literature, law, Spanish history and literature, etc. 3350 items. Oxford, 5 Turl St., 1944.

[**Salloch, William**]. List 46. The Middle Ages. 786 items. New York 3, 344 E. 17th St. (received Dec. 1944).

[**Schoenhof Book Company**]. List no. 41. Second hand & scarce foreign language books on science. About 200 items. Cambridge 38, Mass., 1280 Massachusetts Ave., 1944–45.

[**Schuman's**]. Medical miscellany. List "K" with an appendix, comprising an extensive collection of early American inaugural theses. 28 p., 158 items.

New York 21, 20 E. 70th St. (received Dec. 1944).

[**Sotheran, Henry**]. No. 873. Annotated catalogue of works on physics, including also items on collateral sciences, and comprising the library of JOHN TYNDALL, F.R.S. (1820–93). 88 p., 1197 items. London, W. 1, 2 Sackville St., 1944.

[**Weil, E.**]. Catalogue 5. Old medicine. Art in medicine. Renaissance medicine. Instruments. 297 items. London, N.W. 11, 28 Litchfield Way (received Oct. 1944).

[**Wormser, Richard S.**]. List: BC. Medicine, including some quackery. 133 items. New York 19, 22 W. 48th St. (received Sept. 1944).

[**Wormser, Richard S.**]. List: BP. Portuguese books. 195 items. New York 19, 22 W. 48th St. (received Sept. 1944).

[**Wormser, Richard S.**]. List no. 211. Books and printing. 180 items. New York 19, 22 W. 48th St. (received August 1944).

59. MEMORIA TECHNICA

Critical Bibliography no. 68 — *Isis*, vol. 36, 1945.

This note is published at the end of our bibliography solely for the convenience of the scholars who cut out the whole or part of it, attach extracts to catalogue cards and classify them. By adding this note to the others they will be able to find out rapidly whether this particular bibliography has been analyzed or not.

Isis nos. 100–101 (vol. 35, part 2–3, 1944–45).

These numbers are analyzed in the 68th Critical Bibliography. Every previous number has been analyzed in previous bibliographies.

60. ERRATA

(for previous errata, see *Isis*, 35, 91)

Si quis Argi oculos habere posset eosque omnes diligentissime ac accuratissime intenderet in singulos versus multa tamen eum inter corrigendum effugerent.

The following errata have been kindly communicated by C. W. ADAMS (London), except two contributed by H. P. J. RENAUD (Rabat) and the Editor and bearing their initials.

Vol. 8, p. 387, 11 lines from end: Samuel Bard died in 1821.
8, p. 515, line 23: Aldrovandi died in 1605.
8, p. 568, line 14: Nicollet was born in 1786.
9, p. 157, line 2: for (1924?) read (1921).
9, p. 157, 7 lines from end: for 1583 read 1586.
9, p. 167, 12 lines from end: for (1874–1924) read (1795–1874).
9, p. 202, 24 lines from end: for E. Gerland (1838–1919) read G. Gerland (1833–1919).
9, p. 538, line 3: for Schwenderer read Schwendener.
9, p. 571, line 8: Nichols was born in 1869.
9, p. 633: Carter, T. F., not F. T.
9, p. 636: Clemen, O., not Clement.
9, p. 649: Gerland, G., not E.
9, p. 662: Jayne, IX, 597, not 587.
9, p. 697: for Schwenderer read Schwendener.
12, p. 582: Walsh, J., XII, 351, not 350.
20, p. 185; last line: Darboux was born in 1842.
21, p. 627: Boll, F., XIX, 590, not 589.
21, p. 668: Minkowski, H., XX, 197 ff, not XIX.
21, p. 694: Walsh, Ja. J., XXI, 609, not 659.
24, p. 541: XXIV, 226 refers to Bartram, W., not to Bartram, J.
24, p. 547: Cantor, G., XXII, 575, not 375.
28, p. 120, line 12: Golgi was born in 1843.
28, p. 121, line 19: Hall was born in 1846.
29, p. 476, line 6: Tylor was born in 1832.
34, p. 338, col. 1, line 10: G. G. Stokes, not C. C.
34, p. 338, col. 2, line 12: W. H., not M. H.
34, p. 424, col. 2, line 1, for Trouvenot, read Thouvenot, and similarly in the Index p. 451, col. 2. H. P. J. R.
34, p. 439, col. 1, last line but one: Hele-Shaw, not Hale-Shaw.
34, p. 452, col. 1, line 9: title is Evolution, the modern synthesis.
35, p. 70, col. 2, 19 lines from end: Sabatier was born in 1854.
35, p. 91, col. 2, 22 lines from end: Vol. 19, p. 273, not 275.
35, 179, l. 3, read Faustus Naironus in his Euoplia fidei (Rome 1694). G. S.
Osiris, vol. 7, p. 610: reference to Archibald, R. C., 1.85–154.
Intr., vol. I, p. 294, line 17: Editio princeps was 1526, not 1528.
p. 381, 7 lines from end: T. F. Carter, not T. C.
vol. II, p. 1176: George Pachymeres, add main reference (XIII–2) 972.
p. 1177: Globes, Arabic, and Globes, celestial, add 1014–15.
p. 1215: Peter the Eater (XII–2), not (XII–1).

A few other misprints are not mentioned in these errata, because they are too obvious to cause any error or confusion. I wish to express my thankfulness to the readers who take the trouble to make the above-mentioned corrections in their set of *Isis* and the *Introduction*. I would advise them, after having accomplished that little task, to write their initials near mine at the bottom of this note to indicate that these and the previous errata have been taken into account. G. S.

INDEX OF NAMES INCLUDED IN THE SIXTY-EIGHTH BIBLIOGRAPHY

The Roman figures followed by (1) or (2) refer to the centurial classification (Part I); thus, Alonso, M. (S.J.), XII(1) means that a paper by Alonso is listed under twelfth century, first half.

The Arabic figures refer to the historical and to the systematic classifications (Part II and III) which are subdivided into sections numbered consecutively from 1 to 60. For instance, Arberry, A. J., 13 indicates that a paper by Arberry is listed in section 13 (Iran); Agar, W. E., 27 indicates that a paper by Agar is listed in section 27 (Biology).

The symbols IV(a), IV(b), and IV(c) refer to the new sections on America, Oceania, and Africa at the end of Part II. For instance, Becker, C. O., IV(a) indicates that a paper by Becker is listed in section IV(a) (America).

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QUERIES AND ANSWERS

ANSWER 3 TO QUERY NO. 107. JACOB SALA OF SOMERSET, 1813? (*Isis*, 35, 177, 331, 1944).

You do not state the location of Somerset, so that I am assuming it must be that Somerset in western Pennsylvania largely settled by Germans. "The earliest white inhabitants of Somerset were principally Germans of the Brethren sect" . . . *History of Bedford, Somerset and Fulton Counties, Pennsylvania.* Chicago, 1884, p. 71.

That this German element was sufficiently numerous to support printing is evidenced by the fact that there was a German paper, *Somerseter Zeitung*, as early as 1806, and in 1813 a German Bible was printed in Somerset by FRIEDRICH GOEB, the first Bible printed west of the Alleghanies.

As to why this type of book, it might be mentioned that the type of recipe book, of which I judge from your description this is an example, became prevalent among the Pennsylvania Germans during the early nineteenth century. Compare for instance the account of JOHN GEORGE HOHMAN'S "Der lang verborgene Freund" in EARL F. ROBACKER'S *Pennsylvania German Literature*, 1943, p. 45–48. His account is by no means exhaustive on this type of literature — for instance he does not refer to HOHMAN'S edition of the *Book of Nicodemus*, which he apparently knows only from secondary sources, cf. p. 47. Nor do I feel that he gives adequate recognition to this type of literature which has certainly been of great sociological importance among this people — and even to this day in as large a city as Reading, Pa., people have faith in it.

That people continued an interest in this type of literature in the neighborhood of Somerset is evidenced by the fact that in 1827 there appeared "Eine Sammlung von Neuen Recepten und bewährten Curen für Menschen und Vieh" 12mo. 40 p. listed in SEIDENSTICKER, *First Century of German Printing in America, 1728–1830.*

As to who JACOB SALA was there is no evidence in such county histories of Somerset as I have been able to consult. It is probably of less importance to know who SALA was than it is to understand the reasons behind the book's publication. A type study of this with other known Somerset, Pa. imprints would probably definitely settle the question whether Somerset, Pa. was the place of publication and if it is the rest seems clear.

GEORGE E. PETTENGILL

Reading, Pa.

NOTES AND CORRESPONDENCE

SUR L'ORIGINE DU NOM D'AL-QALAṢĀDĪ. — En dépit de sa ressemblance avec de nombreux toponymes espagnols, dérivés de l'arabe qal'a "château, citadelle, forteresse," en composition avec un nom propre également arabe, tel que Calatrava (Qal'at Rabâh), Catalayud (Qal'at Aiyūb), Calaceite (Qal'at Zaid), le nom du célèbre mathématicien de la période ultime de la domination musulmane en Espagne: ʿALĪ B. MUḤAMMAD AL-BAṢṬĪ, plus généralement appelé AL-QALAṢĀDĪ (m. Grenade 1486 J.C.) ne saurait avoir une telle étymologie. Tous les personnages mentionnés par les biographes comme étant nés ou ayant vécu dans une de ces places fortes sont invariablement qualifiés d'al-Qal'aī, sans plus.

IDRĪSĪ (édit. DOZY et DE GOEJE, Leyde, 1866, texte, p. 195; trad. p. 237) connaît le toponyme Qalaṣa, dans la montagne entre Cuenca et Valence. Le mot s'écrit avec un s fort (ṣād) comme dans le nom du mathématicien. Mais l'ethnique de Qalaṣa est Qalaṣī, et s'il faut lire Qalṣa (car, dit DOZY, la vocalisation est incertaine) ce serait Qalṣī. Pour donner Qalṣāwī, variante que BROCKELMANN (dans l'index de son tome II, p. 555, mais pas ailleurs) met, entre parenthèses, devant le nom de Qalaṣādī, il faudrait que le toponyme d'IDRĪSĪ s'écrivît Qalṣā, avec alif final.

Tout porte donc à croire que l'origine du nom D'AL-QALAṢĀDĪ est romane espagnole, comme celle du nom de son maître AL-QALSHĀNĪ (de Calsena, vers Arcos de la Frontera). On trouve, en espagnol, un mot calzada "chaussée, route empierrée, pavée,

en particulier voie romaine." Le dictionnaire de l'Académie espagnole fait dériver ce mot de calx "chaux"; calzada, c'est via calciata. Le z a pu en effet donner un ṣād en arabe. Il ne manque pas en Espagne, dans les régions qui furent occupées par les Musulmans, et ailleurs, d'agglomérations du nom de Calzada, La Calzada, Calzadilla. Il y a une Calzada de Calatrava, à l'extrémité méridionale du "Campo" de ce nom, dans l'actuelle province de Ciudad Real; une autre: Calzada de Oropesa, vers Puente de Arzobispo (province de Tolède); une autre: Calzada de Sahagun en Extrémadure, etc. L'époque tardive D'AL-QALAṢĀDĪ ne permet pas de lui attribuer une de ces localités comme lieu de séjour, mais ce fut peut-être le lieu d'origine d'un de ses ancêtres, et, ainsi que le fait n'est pas rare chez les Arabes, le nom de cette localité est resté comme "ethnique" dans la famille. Il permettait en l'occurrence de distinguer le mathématicien de Baza (et non pas d'Albacete comme certains traducteurs l'on écrit à tort) des autres "Basṭī."

On objectera peut-être que Calzada aurait du donner en arabe Qalṣada, dont l'ethnique est Qalṣadī, et non Qalaṣādī, ainsi vocalisé dans le Bustān D'IBN MARYAM (texte, édit BEN CHENEB, Alger, 1326=1907, p. 141; trad. PROVENZALI, Alger, 1910, p. 155) d'après AS-SAKHĀWĪ, mort en 1497 (BROCKELMANN, II, 34). Mais ce n'est pas là une preuve, d'autant plus que SAKHĀWĪ est un oriental, sans doute peu familier avec le roman hispanique. Au contraire, dans l'édition de Fès (1315 hég., p. 206) de l'ouvrage biographique al-Nashr al-mathānī, du marocain AL-QĀDIRĪ, on trouve nettement écrit AL-QALṢĀDĪ avec le signe de l'absence de voyelle sur le lām.

H. P. J. RENAUD

Rabat
Institut des Hautes Etudes Marocaines
Juin 1945

PERSONALIA. — HENRI MASPERO, French Sinologist, born 1883, Professor at the Collège de France, died at the camp of Buchenwald, shortly before its liberation, April 1945.

MAX MEYERHOF, the leading historian of Arabic medicine (chiefly ophthalmology and materia medica), died in Cairo on April 20, 1945, after a long illness. Vol. IX of *Osiris*, dedicated to him, will contain his portrait, biography, and bibliography. That volume would have appeared in 1941 or 1942 but for the German invasion of Belgium; it will be published as soon as possible. In the meanwhile a bibliography of MEYERHOF's writings (1898–1943) has been issued in separate form by the Hebrew University of Jerusalem (32 p., 21 March 1944).

PAUL PELSENEER (1863–1945). The Belgian malacologist, PAUL PELSENEER, died in Brussels on May 5, 1945. As Perpetual Secretary of the Royal Academy of Belgium he had edited the history of that Academy, 1772–1922, in 1922 (*Isis*, 4, 522). The *Mélanges Paul Pelseneer* were published in his honor in the *Mémoires du Musée d'histoire naturelle de Belgique* (2e série, fasc. 3, 1206 p. Bruxelles 1936).

REVIEWS

ELAINE SANCEAU: *The Land of Prester John.* A chronicle of Portuguese exploration. xi+244 pp., maps. New York, Alfred A. Knopf, 1944. $2.75.

The present volume is the third in a series of books issued under the title "Byways of History" recently inaugurated by ALFRED A. KNOPF. It deals with the dream which pervaded the folklore of Europe during the Middle Ages, a dream of a mysterious and powerful Christian Empire governed by a wise, mighty, and pious ruler known as Presbyter or Prester JOHN (see SARTON's *Introduction*, vol. 2, 416–17, and *passim*). His kingdom was surrounded by violent heathen lands whose murderous hordes beat against its borders like stormy waves against a solitary rock. But, Prester JOHN was God's favorite son, well provided with earthly goods and endowed with noble virtues, so that all threats were vain and all wars ended in his victory.

The book deals with the inspired search for this ruler and his empire as carried through to its rather disillusioning completion by the brave and pious Portuguese. They did it during Portugal's comet-like rise to naval supremacy, a period which lasted roughly from 1400 to 1580. The episode is a fascinating study in the creation of a myth and in the fusion of truth and fancy in its composition. Man seeks forever his illusions and will fashion them in the image of his culture. The myth of Prester JOHN is the mirror image of the values and goals of medieval humanity.

The book pursues the study into the subtle fusion of religious, commercial, and political motivations which urged the rulers of Portugal to venture into Ethiopia, the sole Christian isle in a Mohammedan

world, which proved to be the realistic hangar for and probably the original cause of the Prester JOHN dream. It deals with the adventures of the Portuguese missions in that land, both military and religious, the hindrances to friendly cooperation and the sad termination of the noble venture.

The Land of Prester John is very well written. Though intended for the general public, and though it does read like a good novel, it is authentic and amply documented. Like its precursor in the series, *The Land of the Great Image*, by MAURICE COLLIS, it deals ably and interestingly with a historic episode not otherwise available in accessible volumes. More important than their novelty, however, is the fact that these historical episodes deal with the medieval culture in an intimate manner which enables the author to bring out living characters that are human and that convey most realistically and accurately the values, hopes, and motives of a society. The account offers an intimate glimpse into a vanished culture and the approach is one which may well be used in the teaching of history generally.

It is worth noting that the problem of color never entered the minds of the Portuguese explorers. They were struck by a variety of differences between Catholic Europe and Coptic Ethiopia, such as the poverty of the Ethiopian court, the strange customs and crude living conditions of the people, the position of women, slavery, etc. Yet generally as little notice was taken of color as was by the authors of the Bible.

The Land of Prester John is a good book, well written and well documented. The story it deals with has not been regarded as part of the main current of history, yet it contains a vital slice of the pattern of culture of medieval Europe.

MARK GRAUBARD

MILDRED CABLE with FRANCESCA FRENCH: The *Gobi Desert*. i+303 pp., ill., maps. New York, The Macmillan Co., 1944. $3.50.

This is one of the most attractive books of travel and quasi-exploration that I have ever read. Miss CABLE and FRANCESCA FRENCH, together with another woman member of the China Island Mission, unaccompanied by anyone but their native carters, made the journey from Suchow to Urumchi — a distance of about 1200 miles — chiefly on foot. Their mission was to spread the gospel of Christ. As such missions go, it was highly successful. Bibles in the various native languages and dialects were sent out ahead of time, so that the way was prepared for the three gentle Christian missionaries. It is in character with the quality and tone of the whole book that the missionary activities of these three ladies are only occasionally referred to, and that when the reference is made it should be in such good taste and of such interest that the reader wishes there had been more detailed reports of their religious activities, and particularly of their conversations with Buddhist and Moslem priests. Some of these we are given, and as might be expected, it is the Buddhists rather than the Moslems who were the most sincerely interested in what the lady missionaries of Christ had to say. After reading this book one's respect for the living representatives of Buddhism is very considerably increased.

The route followed by our travellers was the old Silk Road of MARCO POLO; over this route our itinerant missionaries reached out, over the course of many years, to the varied peoples of the Gobi Desert. The Qazaq nomads in their felt tents; the wild, free, and hospitable Mongols; the fierce Turki, and numerous others, whom they came to know intimately. They were held prisoner by the Moslem General MA, and escaped; they met a living Buddha, the Tiger Prince, a fragile and exquisite desert postmaster, an ancient missionary from Aberdeen who had spent forty years in the desert, and many other characters, all described with sympathy and a nice wit.

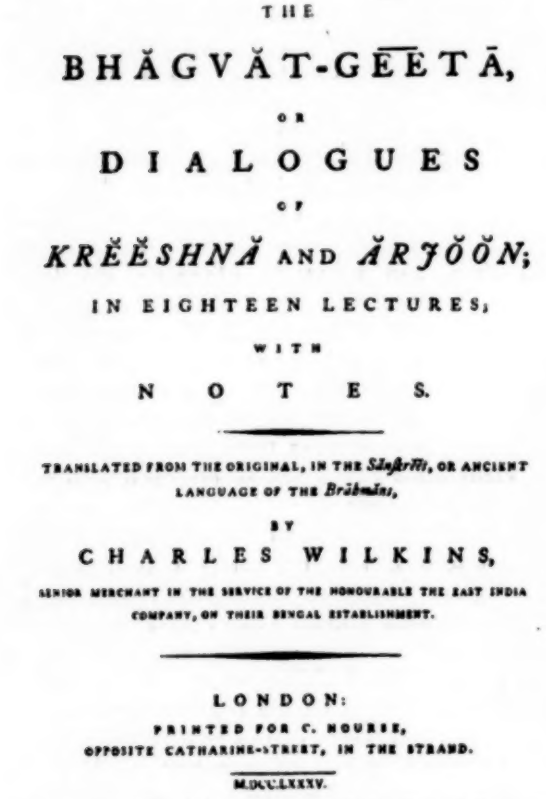
As for the Desert itself, it is infinitely variable with attractions, when one comes to know it, of its own. Their description is delightful. It is appropriate that Miss CABLE should have written this beautiful book in a lovely oasis, in the Chapel of Meditation of the Buddhist retreat on the Lake of the Crescent Moon, on the edge of the Desert of Lob. The frontispiece of this well illustrated book shows the oasis in colored reproduction. Here she was the guest of the Buddhist monk in charge, and, indeed, everywhere she and her companions went the Buddhist monks would do everything in their power to make their stay comfortable and interesting. In this way the missionaries came to see many rare caves and their often extraordinary carvings and wall paintings.

M. F. A. M.

FRANKLIN EDGERTON: *The Bhagavad Gītā*. Translated and interpreted. Part 1: Text and translation, xiv+190 pp. Part 2: Interpretation and ARNOLD's translation, 180 pp. (Harvard Oriental Series, vols. 38 and 39.) Cambridge, Mass., Harvard University Press, 1944. $4.00.

It is well that an edition of the *Bhagavad Gītā* is finally included in the Harvard Oriental Series, for that series is perhaps the most precious one ever pub-

lished by Harvard University Press and the *Gītā* is one of the most precious fruits of India. The choice of the editor was very fortunate, because Professor EDGERTON has a deep familiarity with that sacred text — he has read it word by word with many generations of students. In fact, his edition is largely meant for students, especially for those who wish to work alone; it is chiefly because of those students that the lack of devanāgarī type is regrettable, for



THE

BHĂGVĂT-GĒĒTĀ,

OR

DIALOGUES

OF

KRĔĔSHNĂ AND *ĂRJŎŎN*;

IN EIGHTEEN LECTURES,

WITH

NOTES.

TRANSLATED FROM THE ORIGINAL, IN THE *Sanscrit*, OR ANCIENT LANGUAGE OF THE *Brahmins*,

BY

CHARLES WILKINS,

SENIOR MERCHANT IN THE SERVICE OF THE HONOURABLE THE EAST INDIA COMPANY, ON THEIR BENGAL ESTABLISHMENT.

LONDON:

PRINTED FOR C. NOURSE,

OPPOSITE CATHARINE-STREET, IN THE STRAND.

M.DCC.LXXXV.

FIG. 1. First English translation of the *Gītā*, folio 1785
First printed edition in any language
(Harvard Library)

॥ श्रीगणेशाय नमः ॥

नमः श्रीभगवते वासुदेवाय ।

श्रीमद्भगवद्गीताशांकरभाष्यस्थीपक्रमणिका।

ॐ नारायणः परोऽव्यक्तादण्डमव्यक्तसंभवम् ॥
अण्डस्यान्तस्त्विमे लोकाः सप्तद्वीपा च मेदिनी ॥ १ ॥

भाषाटीकासहित व्याख्या ।

यहाँ यदि विद्वानों ० कृपालीपुरुषोंसे ॥
हेरम्ब होहि मम्भूलहरेम्भूतनियारिबे ॥ ॥ १ ॥
यद्यप गौड़ेकर्णमभूतं निकाहतं निचरिय.वनिकत् ॥
साम्वेदाम्वां परिनिवेदाम्वं तं वाहुरेवं सतवं मनीप्रवि ॥ २ ॥
मतम्पत्यभुतं मत्वा शुद्धमति नरीवनः ॥
लिखते शिष्यहितार्थं गीताभाष्यविवरणम् ॥ ३ ॥

they should be trained to remember the Sanskrit words in their original form; however, this will be remedied after the war.

The present edition is divided into two volumes; the first contains a short preface, then the romanized text and literal translation on opposite pages, finally a few, very few, notes to the text (p. 180–90). Vol. II contains a revised edition of the author's interpretation of the *Gītā* (first published by the Open Court, Chicago 1925) and EDWIN ARNOLD's poetical version, the "Song Celestial." Sir EDWIN did in 1885 for the *Gītā* what EDWARD FITZGERALD had done in 1859 for the *Rubaiyat* of OMAR KHAYYĀM. Neither poet tried to translate exactly, both recreated the original texts and thus evoked from the English world a new and large public for each of them.

Our readers may be expected to be already familiar with the *Gītā*. It will suffice to recall that the *Bhagavad Gītā* (the Song of the Blessed One) or the *Gītā* (for when that word is used alone no other Song is meant) is one of the digressions or interpolations in book VI of the immense Sanskrit epic, the *Mahābhārata*. It is anonymous and dateless; all we can say is that it is probably anterior to the Christian era. It has become exceedingly popular in India, being read by the Hindus somewhat like the New Testament by Christians. That popularity is established by innumerable Mss, editions, translations, and commentaries.

Prof. EDGERTON's own interpretation may seem cold as compared with the fervent eulogies of Hindu scholars, such as the one published in Madras 1937 by D. S. SARMA (*Isis*, 29, 246), but it is more agreeable to Western scholarship. His conclusion

should be quoted in his own words: "It is a mystic poem, dealing with the nature of the soul and body of man, man's relation to God, and the way or ways by which man is to attain salvation. It is poetic, mystical, and devotional, rather than logical and philosophical. It contains many discordant doctrines; to try to unite them all in a consistent system is to do violence to its spirit. In this respect it is like all Hindu speculative literature of its time and earlier, — particularly like the *Upanishads*, to which it is deeply indebted. Like them, too, it is practical in its attitude, seeking religious or philosophic truth not for its own sake but as a means of human salvation."

The publication of this book is very opportune. It will help to forge new bonds of brotherhood between the East and the West and provide for India, not the blind friends whom she is often clamoring for, but good friends. That is far better, both for India and for mankind. G. S.

BERNARD JAFFE: *Men of science in America.* The role of science in the growth of our country. With a preface by GEORGE SARTON. xl+600 pp., 28 pls., 25 figs. New York, Simon and Schuster, 1944. $3.75.

The democratic system implies that citizens are competent to choose their representatives, and to that end the greatest possible number of them should be broadly informed on the problems with which their representatives will have to cope. It has often been pointed out that this is much harder to attain in a very large country than in a small one, and much more difficult again under changing circumstances than in relatively stable times. It is therefore of the greatest importance to inform the American public of the cause which makes our civilization change under our eyes with unexampled rapidity; that is, the constantly accelerating progress of science. However, it is difficult to present the latest scientific advances in a way that will be both attractive and informing to the general reader. Mr. BERNARD JAFFE has selected a human approach to this problem and in previous books has already been very successful in presenting science in terms of the life of leading scientists. His latest book is devoted, the sub-title says, to the *Role of Science in the Growth of our Country*, but, putting the emphasis on men rather than on abstractions, he has chosen for a title: *Men of Science in America.* The book is an excellent one, attractive and informative; the author's enthusiasm for science and devotion to his country carry the reader, as they did him, along this "Scientist's Progress." Moreover, throughout the historical development of science in America we are never allowed to lose sight of the American people; we are made to feel that science has always been and should be more and more consciously dedicated to "life, liberty, and the pursuit of happiness."

Mr. JAFFE's book consists essentially of biographies of nineteen representative American scientists. It was a difficult task to choose these nineteen men, and a harder one perhaps to amalgamate their personal stories with the general history of the country. The author has adopted a method which, as happy solutions often do, solves both difficulties at once. An important part of each chapter describes the state of scientific affairs at the time the particular hero appears on the scene. Also, the hero's associates, opponents, friends, and enemies are given generous mention, so that, as a glance at the index will show, we have here not so much nineteen separate biographies as an informal history of the scientific development of the United States. What in this way is lost in completeness is more than compensated in readability and in human interest.

Although the book has no subdivisions, it is very apparent that the nineteen biographies fall into two contrasting groups: the Ancients and the Moderns. The Ancients are headed by THOMAS HARRIOT, "bringing the Seeds of Science to America," and include FRANKLIN, THOMPSON, COOPER, RAFINESQUE, SAY, MORTON, HENRY, MAURY, AGASSIZ, DANA, and MARSH. The reader is definitely plunged into a historical atmosphere; he wonders at the devotion and the strength of purpose of these men, who pushed ahead into the scientific unknown with the courage of the pioneer, and with as little support from society as their contemporary European colleagues. This is in striking contrast with the lives of the "Moderns": GIBBS, LANGLEY, MICHELSON, MORGAN, EVANS, HUBBLE, and LAWRENCE. Even the earlier ones of this group worked in scientific fields which are still to-day considered as advanced (and Mr. JAFFE does an excellent job of giving to the lay reader an intelligent account of their findings), whereas the Ancients' discoveries are now common knowledge. But what is still more striking is the atmosphere of social approval and, in most instances, the amount of social support which are enjoyed by the modern researchers. The American nation has learned the value of research (which most European countries have not), so that corporations spend monies on research because it "pays," while wealthy individuals donate enormous sums for scientific purposes, in the interest of the public

good. What a difference between HUBBLE's telescope at Palomar, or LAWRENCE's cyclotron at the University of California, and the equipment of THOMPSON or HENRY! One might almost say that the science of to-day, while bearing the same name, has really little in common with the science of 100 years ago. Our environment is changing at such an accelerated pace that it is hard for us to realize the fact adequately.

Mr. JAFFE's book will have many readers, and will teach each one many a lesson.

P. LE CORBEILLER

Harvard University

EMMANUEL DE MARGERIE: *Critique et géologie. Contribution à l'histoire des sciences de la terre (1882–1942)*. Tome premier. xx+659 pp., 250 figs. Paris, Colin, 1943 [colophon dated Mâcon, February 1944].

One of the first French books to reach me toward the end of the first war was the translation, by EMM. DE MARGERIE, of EDUARD SUESS' monumental work, *Das Antlitz der Erde* (1883–1909). That translation had begun to appear in 1897 but was completed only in 1918; it was enriched with a large number of bibliographic notes and some 500 new illustrations. MARGERIE's *Face de la terre* was a monument in every way worthy of SUESS' original. It gives one pleasure to record that in spite of its large size (3788 p., 675 figs., 17 pls.) no less than 18,000 copies of it were sold in forty years. That great work was my initiation to tectonics and it fired me to such a pitch of enthusiasm that instead of reviewing it I devoted to it a very long and ambitious essay.[1] Now, strangely enough, the first book to reach me from liberated France toward the end of the second war, is one written by the same author. It astonished me almost as much as the *Face de la terre*. Looking at it from the outside, it is so large (it weighs 5½ lbs.), so well printed, so full of illustrations (no less than 250), that one wonders how it could be produced (in Mâcon, Bourgogne!) in the midst of war. We could hardly publish such a book in the United States to-day! Let us now examine the contents.

Critique et géologie might be called an autobiography, but it is one of an unusual kind; it is rather a critical autobibliography preceded by a short biography (p. 96–136). The idea is excellent, for when we are thinking about a man of science, there is nothing which we want to know more than the genesis and development of his thought, and his works are the landmarks of that development. The author is the outstanding member of an old Catholic family; the most distinguished member of the family next to himself was his uncle, AMÉDÉE DE MARGERIE (1825–1905), scholastic philosopher, disciple of JOSEPH DE MAISTRE, voluminous writer, professor in Nancy and Lille.[2] EMMANUEL was born in Paris in 1862, and his vocation is sufficiently established by the fact that he became a member of the Société géologique de France at the age of fifteen and attended his first geological congress as early as 1878! Ten years later he was already counted as one of the creators of tectonics, helping with ALBERT HEIM to establish an adequate terminology (1888). His *Catalogue des bibliographies géologiques* (1896) and his *Face de la terre* (1897–1918) are standard works of lasting value. He was one of the organizers of the World map on the scale 1:1,000,000, of the Bathymetric map of the oceans, of the geological maps of France and of the world. In addition to the *Catalogue* of 1896 he compiled many geologic bibliographies and historical studies, e.g., a history of the French geological society (1930; *Isis*, 16, 559) and a discussion of the work of SVEN HEDIN and of Tibetan orography (1929; *Isis*, 15, 276). Finally, he edited the geological memoirs of his master, MARCEL BERTRAND (1847–1907), in his own masterly way (3 vols. 1927–31; *Isis*, 11, 478; 13, 477; 18, 475). For sixty years EMMANUEL DE MARGERIE has been working not only as a geologist in his own fields of predilection, but also as a diligent, honest, and generous critic of his fellow workers.

The present volume (vol. 1) deals only with four main topics. I. *Dislocations of the crust* (p. 139–94). A review of his work on tectonics from 1878 on. II. *Shapes of the ground* (p. 195–347). Studies of tectonics as applied to physical geography. When the author began his work, geography was still considered in France as a purely historical, archival and bookish subject hardly connected with natural history. It is clear that such a perverse situation could be modified only by a geologist. Indeed, it was hardly possible for a geographer of the old school, untrained in the natural sciences, to appreciate properly geographical realities. On the contrary, for a geologist, especially one familiar with the new tectonic ideas, it was relatively easy to interpret landscapes, to explain the vicissitudes of each "pays" or country with full understanding of its physical limitations. III. *Geological bibliography*

[1] La synthèse géologique de 1775 à 1798 (*Isis*, 2, 357–94, 3 figs., 1919).

[2] AMÉDÉE DE MARGERIE: *Souvenirs* (516 p., Sens 1907), not available to me.

(p. 348–73). Apropos of his *Catalogue* of 1896, the author discusses bibliographical problems. Not only was that catalogue very rich (3918 items), but was well classified and indexed and the references rigorously accurate. The author was one of the first scientists capable of appreciating, in the first place, the fundamental importance of history and bibliography, in the second place, the need of accuracy. Inaccurate history and inaccurate bibliography are just as worthless and disgraceful as inaccurate geology. IV. SUESS' *Antlitz der Erde*, the French translation and the controversies which it entailed (p. 374–659).

One may object that this account of geology from 1882 to 1942 is too much centered upon the author, but that is the weakness of every autobiography, whichever form it may assume. The work is richly illustrated with maps, sketches, portraits, autographs, and facsimiles of title-pages. If it is not a complete history of geology for that period, at any rate it contains such a rich collection of materials ad hoc, that the historian of geology will have to keep it on his "first-aid" shelf together with the *Catalogue* of 1896 and the *Face de la terre*. Let us hope that our old friend, "ce bénédictin de la géologie," will be granted enough years of health and strength to complete this great and final gift, that the second volume will not be delayed too long and that it will include the indices without which such a work loses a good deal of its practical value.

GEORGE SARTON

E. PARMALEE PRENTICE: *Food, war and the future*. 164 pp., 5 ill. New York, Harper and Brothers, 1944. $2.50.

Five years ago the author of this small book published *Hunger and history* (reviewed in one of the issues of *Isis* held up by the German invasion of Belgium) in which he called attention to an aspect of our past which has never received sufficient attention. In *Food, war and the future* he continues the good work by stating and attacking some problems which must be solved if the coming peace is to be more than a brief armistice. Unfortunately, the problems are neither simple, pleasant, nor easy of solution and do not get at all into the more popular formulae for settling the affairs of mankind. Before a lasting peace is possible we must be able to answer the question, "How will the people of the world be fed when the war is over, where is the food coming from?" Most of us are agreed that rationing will have to continue for a time but the author is looking for a more permanent solution.

He has emphasized a fact which we would do well to consider, i.e., that a chronic food shortage punctuated by acute famines has been the "normal" condition of human living. It was only about a hundred and fifty years ago that a fortunate concurrence of events changed the picture sufficiently to give a respite to that portion of the human race which lived in Europe and the Americas. The stage had been set by the spread of European agriculture to the New World. Then within a short time a number of things happened. First, there was the rise of liberalism, so that men were permitted to control their own fields and the produce of their labors were not taken from them. Second, the invention of agricultural machinery increased greatly the amount of food that could be produced per worker (if not per acre), and thus the thinly settled countries of the New World could produce a great food surplus. Third, mechanical transportation had developed to a point where it could carry this surplus to industrial Europe. The result was that nearly half of the human race experienced an unprecedented century of abundance, and promptly forgot the living conditions of their immediate ancestors. Of course, our race had experienced shorter periods of alleviated hunger following such technical advances as the invention of agriculture and of relatively stable government but it had always met every advance by breeding up to the limit which could be supported by the available resources. Hunger never left it for long. The author is convinced that, unless we develop more foresight than we have in the past, the way of life that we know will be only an interlude in a long dreary history. At the last analysis our present high standards of living depend upon a proper balance between the production of food and the production of babies.

While the author's immediate concern is with ways and means of increasing our food supply, such as the breeding of better crop plants and farm animals and improved agricultural practices generally, he emphasizes the futility of increasing the food supply if population grows unchecked. No country illustrates this better than India. Parenthetically, Prof. KARL SAX in a recent paper (*Scientific Monthly*, 58, 66–71, 1944) has asked a very pertinent question: "Is the Occidental world going to adopt Oriental standards of living in order to feed and industrialize the people of Asia?" The reviewer would like to raise another question, "Does a country like the United States which practices birth control have any moral obligation to furnish food to a country like India which does not?"

So much for the author's main thesis. In addi-

tion he calls attention to a number of minor details in our agricultural practices which in their entirety become of major importance. For example, he shows the time lag in our agricultural colleges between the discovery and the teaching of improved methods of production. Particularly interesting is the author's account of the superstitions which surround our thoroughbred farm animals. There is no doubt that the introduction of pure bred European stock greatly improved the scrub cattle of the earlier settlers but the standards of the various breed associations today are so archaic that they are a real hindrance to further improvement. Since geneticists have devised the progeny test, the insistence on registered pedigree becomes useless, "it is not necessary to look back of a sire when his breeding value has been established." One interested in the history of agriculture should enjoy the author's exposure of the pedigreed herds, and the romantic history of them which has been made to order. The owners and breeders of thoroughbreds constitute an intrenched special interest and their influence will have to be rooted out of our agricultural colleges before any real progress is possible.

All in all the author has produced an interesting, stimulating, and important contribution, although *Food, war and the future* in itself is sadly lacking in unity, a real disadvantage if the book is to be read by itself. However, everything in the work fits beautifully into the larger picture of *Hunger and history*, and if the two books are read together an essential unity emerges.

CONWAY ZIRKLE

HERBERT JOHN WEBBER and LEON DEXTER BATCHELOR (Editors): *The citrus industry.* Vol. I, *History, botany and breeding.* xx+1028 pp., 233 fig. Berkeley and Los Angeles, University of California Press, 1943. $7.50.

This is one of the books published in commemoration of the seventy-fifth anniversary of the founding of the University of California and it would have been difficult, perhaps, for the University to have found a more valuable type of memorial. Volume II, *The production of the crop*, and volume III, *The harvesting, marketing and utilization of the crop*, have not yet appeared but each of the three volumes is complete in itself and, while the whole should be a well integrated contribution, the first volume holds the greater interest for biologists and historians of science. Indeed, the amount of ground covered in this volume is surprising, and suggests that the citron blossom is the real "flower in the crannied wall" and, while the authors do not attempt to tell us "what God and man is," they do cover a considerable portion of botanical and agricultural history. They begin by tracing the origin and wanderings of the citrus fruits and end by making a real contribution to science in their exposition of the botany, genetics, morphology, and physiology of the *Aurantioideae*.

The first three chapters (128 p.) are by the Senior Editor. He shows in the first chapter that the cultivated citrus fruits originated in southern China, Malaya, and the adjacent islands, where their wild relatives are still found. The earliest reference we have to any of these fruits is in the Yu Kung (c. 2000 B.C.) where oranges and pummeloes are mentioned. Strangely enough, the first species to spread westward was the citron (*Citrus Medica*), which is pictured in the Karnac temple (c. 1500 B.C.) and on Samaritan coins. This is the fruit which is described by THEOPHRASTOS, VIRGIL, DIOSCORIDES, and PLINY. In the tenth century after Christ, the sour orange (*C. Aurantium*) was carried by the Arabs from India to northern and eastern Africa and to southern Europe. In the twelfth century the lemon (*C. Lemon*) spread from India where it probably originated. It is, surprisingly, a relatively late comer to China. The Mongolians, however, had invented lemonade by 1299. The sweet orange (*C. sinensis*) did not reach Europe until the fifteenth century and was brought in either over the Genoese trade route or by the sea-faring Portuguese. The lime (*C. aurantifolia*) and the pummelo (*C. grandis*) were spread by the Arabs along with the sour orange and the lemon, but the tangerine (*C. retriculata*) did not reach Europe until modern times. The grapefruit originated as a cultivated sport in the West Indies, where the citrus fruits had been taken by COLUMBUS.

The whole story of the spread of the citrus fruits impinges upon many historical events, such as the barbarian invasion of the Roman Empire, the crusades, etc. It even touches upon American anthropology, for the Indians obtained seeds from the Spaniards and planted them, with the result that white settlers in Florida often discovered "wild" orange groves, and many of us have eaten oranges from scions top-grafted on these groves.

In the second chapter the climatological and general ecological requirements of the citrus fruits are described, and in the third an account of the citrus regions of the world is given.

The fourth chapter (347 p.) is by Dr. WALTER T. SWINGLE and is entitled *The botany of citrus and its wild relatives of the orange subfamily*. Pub-

lished separately this would be a notable book in itself. It is perhaps the finest monograph of a family of cultivated plants ever written and represents work done over a period of forty-five years by one of the distinguished botanists of this generation. It is, of course, somewhat technical for the general reader but its value is obvious. It covers 33 genera, 203 species, and 38 varieties. It should serve as a great stimulus for future research designed to discover new drugs, oils, fruits, and vitamins in one of our most valuable plant families.

Chapter five (185 p.), entitled *Cultivated varieties of citrus*, is written by the Senior Editor. He describes 181 varieties of the 9 most cultivated species and 34 varieties of species hybrids. It is a definitive account of the present status of citri-culture.

Chapter six, *General morphology, histology and physiology* (49 p.), is by the Junior Editor and HOWARD SPRAGUE REED. This and chapter seven, *The mineral nutrition of citrus* (48 p.), by HOMER DWIGHT CHAPMAN and WALTER PEARSON KELLY, are technical. They are of interest to the professional botanist and are of value to all investigators engaged in citrus research. The next two chapters, *Seed reproduction: development of gametes and embryos* and *Genetics and breeding* (141 p.), are by HOWARD BRETT FROST. They are also technical but the subject matter is such that they have a broader interest.

The several species of citrus hybridize easily and spontaneously and, because of the presence of nucellar embryos, they can easily be perpetuated. This odd device should be described. First, the regular embryo aborts; next a bit of the nucellus, which is purely maternal tissue, grows into the place of the regular embryo and produces a new embryo, which develops into a genetic duplication of the mother plant. Seeds thus formed are but a device for vegetative reproduction like budding and grafting, and, when a new hybrid is formed, its nucellar embryos breed true.

Citrus can be easily grafted and graft hybrids or chimeras are not at all rare. Perhaps the most famous of these was the "Bizzaria," a sectorial chimera between a citron and a sour orange which appeared near Florence in the seventeenth century. The illustration of this monster, taken from PETRUS NATUS (1674), is reproduced (p. 874). Interest was so great in this chimera that it was described twice in the *Phil. Trans. Roy. Soc. London* (I, 553; X, 313). Incidentally, in such a comprehensive work on citrus as this volume, it is unfortunate that, perhaps, the first mention of possible spontaneous plant hybridization should be omitted. 'ABD AL-LAṬĪF (1162–1231) stated casually in referring to oranges and lemons, "When one plants these species which resemble one another near together, one can obtain from them innumerable varieties."

The last chapter, *Bud variation and bud selection* (38 p.), by ARCHIBALD DIXON SHAMEL, describes one of the most practical methods of securing improved varieties, although improving plants which have been domesticated for thousands of years is not easy.

There is a bibliography of 58 pages and a detailed index.

If volumes II and III maintain the standards set in volume I, *The Citrus Industry* will be a major contribution to botanical literature.

CONWAY ZIRKLE

JOHN ROXBROUGH NORMAN [1898–1944]: *Squire. Memories of Charles Davies Sherborn [1861–1942]*. 202 pp., 10 pls., 3 illus. London, Harrap, 1944. 15 s.

This is a well documented, fair, and pleasantly written biography of one of the most original characters of our time, a man to whom every zoologist is deeply indebted. CHARLES DAVIES was the son of CHARLES WILLIAM SHERBORN (1831–1912),[1] line-engraver and etcher, designer of many hundreds of bookplates; he was born in Chelsea, in 1861; financial misfortune obliged him to end his schooldays at fourteen and earn a living; however, a strong instinct brought him already in 1886 within the British Museum, where he spent the whole of his long life.

His first book was a *Bibliography of the Foraminifera* (London 1888), and a few years later the Smithsonian Institution issued in two parts his *Index to the genera and species of the Foraminifera* (1893–96). In the meanwhile, he had extended the index idea to the whole animal kingdom. His main title to immortality is the *Index animalium* begun in 1890 and completed in 1933. The first section, 1758–1800, was published in 1902, the second section, 1801–50, appeared in parts between 1922 and 1933. The immense work, more than 9500 pages, including about 440,000 references, and involving the indexing of nearly 28,000 books, was done almost completely by himself. While doing that he was engaged in various other bibliographic undertakings and in collecting.

The bibliography preceding the *Index animalium*

[1] CHARLES DAVIES SHERBORN: *Sketch of the life and work of Charles William Sherborn, painter-etcher. With a catalogue of his bookplates.* London 1912.

is of great value to historians of zoology. In addition, SHERBORN published many bibliographic papers the purpose of which was generally to determine for the *Index* the exact dates of publication of whole works or of their several parts. When the *Journal of the Society of Bibliography of Natural History* began to appear in 1936, his first contribution was a "Catalogue of papers concerning the dates of publication of natural history books"; various other papers of his appeared in that journal, the last being a study on MOFFET's *Insectorum theatrum* 1634 (1943). He compiled many other catalogues and bibliographies. It will suffice to quote his manuscript catalogue of portraits in the British Museum, and his latest book, *Where is the . . . Collection?* (Cambridge 1940), an extremely valuable series of nearly 2000 entries indicating the whereabouts of the natural-history collections which had come under his notice between 1880 and 1939.

"SQUIRE" (as SHERBORN was affectionately called by his friends) was an astute and persistent collector but a very generous one, keeping little for himself, always anxious to complete the national collections not only in his own Museum, but in the Museum of Bloomsbury Square, the London Museum, the Victoria and Albert, etc. He never sold anything, being inhibited by a prejudice which I share, though I recognize that it is somewhat unreasonable, for if nobody sold how could anybody buy? He assumed early a number of eccentric but lovable traits which were described by the Barbadian novelist, WILLIAM JOHN LOCKE in "At the gate of Samaria" (1905). The John Kent of that novel is recognizably our hero, then in the middle of life, yet completely developed with all his virtues and weaknesses. He had much interest in the arts of yesterday and before, but none in music; he was a discriminating reader of old books. Apropos of GIBBON's *Decline and Fall* he remarked: "a wonderful book, wish I had written it, more wonderful than the *Index animalium* perhaps."

The last years of the old man living alone in London during the worst of German attacks were painful. He did not complain of the hardships caused by the war, for that would not have been fair to others; he took it out on the weather; it has never been disloyal for an Englishman to curse the English weather. He died suddenly on June 22, 1942.

The only defect of this book is the lack of an index, which is especially shocking in a biography of the Prince of Indexers. It is a pity that the author did not live to see it. Born in London in 1898, he became a distinguished ichthyologist, with many papers and books to his credit. He had joined the staff of the British Museum in 1921, and since early in the war was in charge of the Tring Museum, now a branch of it. He died at Tring after a long illness in May, 1944.[2] His book will delight the hearts of zoologists, that is, of those of them who care for history and bibliography.

GEORGE SARTON

PAUL ARTHUR SCHILLP (Editor): *The Philosophy of Alfred North Whitehead.* The Library of Living Philosophers, Vol. 3. xviii+745 pp. Evanston, Ill., Northwestern University Press, 1941.

Among contemporary philosophers Professor WHITEHEAD is without doubt the most illustrious as he is certainly the most difficult, so that the present work is a fitting tribute on the one hand and a welcome commentary on the other. Unfortunately Mr. SCHILLP's meritorious plan of exhibiting contemporary thought falls short of fulfillment in the present instance. For Professor WHITEHEAD was unable to draw up a Reply to his critics. "To my great regret," he writes in an explanatory note, "bad health, culminating in a serious illness, has prevented study of the chapters of this book before publication." This is a great pity, as Mr. WHITEHEAD's critics raise some interesting questions the replies to which, if they had been forthcoming, might have thrown light on the dark places in his philosophy. Instead of a Reply Professor WHITEHEAD contributes two hitherto unpublished papers entitled "Mathematics and the Good" and "Immortality," both of them tantalizingly brief, yet like all else of his immensely suggestive. The first paper especially illustrates his humanity and wit, together with his great power of generalization. Mr. WHITEHEAD's thesis here is that value is inseparable from pattern, relationship, form, and that since mathematics is the science of patterns in general, mathematics may be taken as providing a clue to the nature of value. "The infinite," he writes, "has no properties. All value is the gift of finitude which is the necessary condition for activity. Also activity means the origination of patterns of assemblage, and mathematics is the study of patterns. Here we find the essential clue which relates mathematics to the study of the good, and the study of the bad." Yet the clue must strike the reader of this essay as a fatally unhelpful one, if both good and bad are instances of pattern. For if mathematics is the study of pattern as such, how by its means alone are we to

[2] Obituaries in *Nature*, 153, 738, 1944 and in the London *Times* of May 30, 1944.

distinguish between good and bad, or acquire an insight into the nature of the good? Mr. WHITEHEAD is aware of the difficulty, and his attempt to meet it, though beguiling, is implausible.

In the "Autobiographical Notes" with which the book opens Mr. WHITEHEAD writes pleasantly of things that counted in his life. The chief of these was his study of mathematics at Cambridge, yet almost as important was his reading of history and poetry, especially the poetry of WORDSWORTH and SHELLEY. Philosophy cast its spell, but not it seems for long. "I nearly knew by heart parts of KANT's *Critique of Pure Reason*. Now I have forgotten it, because I was early disenchanted. I have never been able to read HEGEL: I initiated my attempt by studying some remarks of his on mathematics which struck me as complete nonsense." During his later years at Cambridge as fellow and lecturer, Mr. WHITEHEAD became interested in politics, his sympathies being then, as they are now, on the liberal side.

Professor WHITEHEAD says little about his intellectual development, and it is to this subject that Mr. VICTOR LOWE's essay, much the longest in the book, is devoted. Mr. LOWE writes with the consecration of a disciple, and what he takes to be development is often, to the grosser eye, merely succession. He tries to show that some of the basic ideas of Mr. WHITEHEAD's philosophy go back to his early mathematical works. The argument at times hangs by the slenderest of threads, as when Mr. LOWE cites in support of his thesis Mr. WHITEHEAD's disclaimer in *Universal Algebra* of the postivistic view of reasoning, or his contention in the same work that mathematics is not merely the science of number and quantity. Yet there can be no question that some of Mr. WHITEHEAD's most characteristic notions antedate his strictly philosophical work. For example, the method of extensive abstraction is at least foreshadowed in *Mathematical Concepts of the Material World*, published in 1905. Again, from the first, Mr. WHITEHEAD was preoccupied with the question whether the three independent principles of the classical concept of nature, namely, points, instants, and particles, could not be further reduced, or shown to be interdependent. To Mr. LOWE it was this preoccupation that "goaded on all of WHITEHEAD's intellectual efforts."

The first stage in Mr. WHITEHEAD's development, the mathematical and logical, is followed by what Mr. LOWE calls the period of pre-speculative epistemology. Three papers appeared at this time, "Space, Time and Relativity," "The Organization of Thought," and "The Anatomy of Some Scientific Ideas," all expressing the view that ideas arise out of sense impressions. How then are such scientific concepts as points and instants to be explained empirically? Mr. WHITEHEAD's answer is that, since fragmentary sense-experiences are alone actual, "the problem is to exhibit the concepts of mathematical space and time as the necessary outcome of these fragments by a process of logical building up." Hence the method of extensive abstraction, which is now applied to time as well as to space. Yet if at this stage Mr. WHITEHEAD is an empiricist, he does not disclaim metaphysics altogether, only a metaphysics that would interfere with science.

Next comes Mr. WHITEHEAD's attempt to elaborate a philosophy of science. The results are set forth in the *Enquiry Concerning the Principles of Natural Knowledge*, *The Concept of Nature*, and *The Principle of Relativity*. In this, as in the prior, phase of his thought Mr. WHITEHEAD's general viewpoint is empirical, but empirical with a difference. For one thing, there is his more Platonic than empirical doctrine of 'objects,' the same objects that are later called eternal; for another, there is his doctrine of 'significance,' which is no less a departure from ordinary empiricism. According to this doctrine what we directly perceive are not only things but the entire network of their spatial relations with other things in the universe. So relationships are not, as is commonly supposed, classes of hypothetical percepts or a result of inference; they are a direct datum. When we are looking, say, at the closed door of a cupboard, we are not only aware of the door, but "we are also aware that inside the cupboard there are events whose space-relations complete the space-relations of the things that are fully seen." The one sort of awareness is as immediate as the other. Bound up with this as with other points in Mr. WHITEHEAD's philosophy of science is his famous attack upon the "bifurcation of nature" into two divisions, "namely, into the nature apprehended in awareness and the nature which is the cause of awareness."

Finally, there is Mr. WHITEHEAD's attempt, in the grand manner, to achieve a world-embracing synthesis. This is the period of his major works: *Science and the Modern World*, *Process and Reality*, *Adventures of Ideas*, and *Modes of Thought*. What are the chief features of Mr. WHITEHEAD's metaphysics? Briefly, the universe is a basic spatio-temporal flux, the characters it has to show being derived from the various objects which permeate it. Things appear to be separate and distinct, in reality they are not. They interpenetrate each other. And this interpenetration of things is not merely super-

ficial, but involves their being or essence, so that they literally are what they are, because of the "ingression' into them of all other things. So in physics "the various occasions in nature contribute to each other's natures. The whole environment participates in the nature of each of its occasions." To Mr. WHITEHEAD then the world is an interpenetrating whole, no part of which can be understood without reference to every other, nor without reference to metaphysical categories. This idea has appeared before in the history of philosophy, and notably in poetry, but no one has elaborated it more impressively or with greater originality than Professor WHITEHEAD.

The other contributors to this book, if they are more critical than Mr. LOWE, are no less cognizant of Mr. WHITEHEAD's achievements. Except for Mr. DEWEY, whose topic is the philosophy as a whole, these contributors deal with the various aspects of Mr. WHITEHEAD's, thought: his logic, epistemology, metaphysics, his theory of science, value, art, religion, morals, and education. The net result is not as clarifying as one might wish, yet all the papers are conscientious and some of them extremely able. Of the latter only a few can be mentioned here, if this review is to be kept within permissible, not to say becoming limits.

Mr. F. S. C. NORTHROP's essay, "WHITEHEAD's Philosophy of Science," is a searching examination of some of Mr. WHITEHEAD's leading ideas on a difficult subject. One of these ideas is that scientific objects are not merely postulated, but must be defined in terms of sense-awareness. Yet can an electron be so defined? Mr. NORTHROP believes it cannot, and hence argues that it must be something postulated, not something sensed. "The moment this distinction between the sensed and the postulated is admitted," he writes, "WHITEHEAD's doctrine that nature is only what is disclosed in sense-awareness is rejected and bifurcation cannot be escaped." Equally indefensible, in the eyes of his critic, is Mr. WHITEHEAD's rejection of EINSTEIN's view of simultaneity. It is indefensible because on no other view can the concept of public time be as satisfactorily explained. So Mr. WHITEHEAD's account of public time, as of scientific objects and scientific causality, is untenable, or at least inadequate. These defects, together with his excessive regard for the deliverances of sense, are owing, says Mr. NORTHROP, to Mr. WHITEHEAD's acceptance of BERGSON's emphasis upon immediate intuition and the primacy of process, on the one hand, and his determination to avoid the philosophical difficulties of 'bifurcation,' on the other.

Professor E. B. MCGILVARY's paper, "Space-Time, Simple Location and Prehension," reinforces some of Mr. NORTHROP's conclusions, while making new points of its own. Mr. MCGILVARY devotes considerable attention to Mr. WHITEHEAD's criticism of EINSTEIN's definition of simultaneity in terms of light signals. Mr. WHITEHEAD has objected to this definition that it ignores the fact that "there are blind people and dark cloudy nights, and neither blind people nor people in the dark are deficient in a sense of simultaneity." But this, as Mr. MCGILVARY points out, is to overlook EINSTEIN's distinction between simultaneity at the same place and simultaneity at a distance. More debatable, if not more acceptable, is Mr. WHITEHEAD's denial of simple location; the notion that, in expressing the spatio-temporal relations of a bit of matter "it is adequate to state that it is where it is, in a definite finite region of space, and throughout a definite duration of time, apart from any special reference of the relations of that bit of matter to other regions of space and to other durations of time." In Mr. WHITEHEAD's view this is a fallacy and the bifurcation of nature is its infamous outcome. To Mr. MCGILVARY, however, it is in the strict sense no fallacy at all, "since the very essence of a 'fallacy' is that it is a logical absurdity, a self-contradiction." And this the notion of simple location assuredly is not. Whatever warrant Mr. WHITEHEAD might claim for his statement that "in a certain sense everything is everywhere at all times," he cannot claim the warrant of experience. Not of Mr. MCGILVARY's experience, anyhow.

If it is difficult to evaluate Professor WHITEHEAD's work in the philosophy of science, or even to make out its exact character, no such difficulty arises, or hardly, with regard to his contributions to mathematical logic. These are of the first importance, as Professor W. V. QUINE shows in "WHITEHEAD and the Rise of Modern Logic." The paper is an admirable account of Mr. WHITEHEAD's logical development, his innovations as well as his debt to such writers as PEANO, FREGE, and RUSSELL. Nor is this all. While Mr. QUINE excludes from his survey the metaphysical writings and so limits himself to technical problems, yet in connection with these he raises some highly interesting philosophical questions. For example, what manner of things are classes? Can they be so construed as to avoid all ontological presuppositions? The authors of *Principia* are ambiguous on this point. For they reintroduce in practice, what they would deny in theory, namely a transcendent universe. Now Mr. QUINE believes it is possible to avoid the assumption

of such a universe by transforming ontological questions into linguistic questions. And he gives several demonstrations of how this is to be done. It is no fatal objection to Mr. QUINE's extreme nominalist proposal that it would involve sacrificing fragments of classical mathematics; nor is there any reason to fear that, in doing away with metaphysics, it would do away with logic itself.

Mr. QUINE would eject all metaphysics from logic, while his fellow contributor, Mr. A. E. MURPHY, would inject some logic into metaphysics. His essay, "WHITEHEAD and the Method of Speculative Philosophy," is a brilliant inquiry into the nature of metaphysical thinking. At the outset Mr. MURPHY distinguishes between two kinds of speculation, the one legitimate, the other not. The first "strives to extend the boundaries of understanding beyond its previously established limits," and by methods at least allied to those of science; the second "as practised by metaphysicians claims to achieve this extension by a quite special method of its own." Whatever this method may be, and it has been variously conceived, as insight, intuition, or the higher reason, the conclusions reached by its means are neither testable in themselves, nor reconcilable with each other. So metaphysicians tell us that the ultimately real is what is intelligible; that the real transcends intelligence; that the real is changeless; that the real is nothing but change. What are we to say of an inquiry which produces conclusions that point in all directions at once? What Mr. MURPHY says is this. The speculative philosopher, impressed with some pervasive aspect of human experience at the same time that he is concerned to reach an all-embracing wisdom, treats this aspect as if it were the clue to ultimate reality, a disclosure of the true or final being of things. The philosopher who is deeply sensible of the transitoriness of things and finds it enlightening and humanly wise to view them in that character will declare that becoming is the sole reality and all else apearance. *Quod erat demonstrandum.* Or he may feel, on the contrary, "that the things that pass are only shadows." In that case he will incline to a metaphysics of the eternal "which, while the mood persists, no amount of 'refutation' from a different philosophical standpoint will be likely to shake." This transformation of what is felt to be of 'ultimate' importance to human beings into ultimate reality is, Mr. MURPHY argues, "the normal procedure of speculative philosophers." That it is a fallacious procedure hardly needs saying.

LEO ROBERTS

Cambridge, Mass.

ARISTIDES A. MOLL: *Aesculapius in Latin America.* xii+639 pp. Illustrated. Philadelphia and London, W. B. Saunders Company, 1944. $7.00.

In spite of many cultural and commercial efforts to promote a better understanding of Latin America among the English-speaking peoples of North America, there remain still too few published sources of reliable information. Only recently have medical libraries in the United States and Canada become interested in Latin American medical publications. The chief writings on South American medicine by North Americans still remain NICHOLAS SENN's *Travel Notes from South America* (Chicago, 1908); WILLIAM J. MAYO's "Observations on South America" (*J.A.M.A.*, 75: 311, 377, 475, 540, 606, 672, 1920); FRANKLIN H. MARTIN's *South America from a Surgeon's Point of View* (Chicago, 1922), and various articles by Doctor ARISTIDES MOLL in the publications of the Pan-American Sanitary Bureau.

One should therefore warmly welcome the earnest effort of Doctor MOLL, the Secretary-Editor of the Pan-American Sanitary Bureau in Washington, D. C., to offer a coherent, comprehensive, and accurate account of the development and status of medicine in Latin America. While the volume is well printed and illustrated, and while it contains copious footnotes, an appended chronology for diseases, a medical and general chronology for Latin America (pp. 520–581), and a fair bibliography and index, and while it contains a vast number of interesting statements, with an amazing number of dates and names, yet the volume is apt to leave the reader with a feeling of skepticism. Perhaps another try will give us the really informative and well-documented account of Latin American medicine that we so badly need.

Doctor MOLL's organization of his material reminds one of the brilliance of the late FIELDING H. GARRISON, whose superb *History of Medicine* (also published by Saunders of Philadelphia) went into four editions, the last being in 1929. Unfortunately, Doctor MOLL does not document his statements with the same care that characterized GARRISON, nor are his data as well handled.

Perhaps Doctor MOLL's enthusiasm for Latin America runs away with his judgment. In Chapter 2, "The Indian Treasure House," for example, he lists many plant drugs as being introduced into medicine by the Indians. Only a few in fact are worth much. The most important, cinchona, is not adequately discussed. Doctor MOLL's account of trephining might be considered to be casual in view of the many excellent studies which are available.

Again Doctor MOLL's enthusiasm for Spain's medical status (Chapter 3) persuades him to make such an unjustified implication as the one that SERVET described "fully a century before HARVEY, the circulation of the blood." It might have been better to have used as a basis for this chapter FIELDING GARRISON's excellent "Epitome of the History of Spanish Medicine" (*Bull. N. Y. Acad. Med.*, 7: 589–634, 1931). Failure to give satisfactory documentation makes it difficult throughout the volume to assess the justification of many of Doctor MOLL's statements. Sometimes Doctor MOLL's footnotes are as irrelevant as those in *Time*. Thus on page 60, discussing the origin of syphilis, he says "VIRCHOW (1896) and ELLIOT SMITH (1930) also failed to find luetic signs in pre-Columbian Eurasian and North African bones." The footnote to this passage reads "At least in Lower California, the disease seems to have been introduced by the whites (by HUIDROBOS' expedition in 1736)". There are no references to VIRCHOW's or SMITH's reports, nor is there documentation of the claim that syphilis was introduced in Lower California by HUIDROBOS' expedition.

Doctor MOLL's account of the "Cronistas," the Spanish chroniclers, could be expanded with profit. It would be well worth while to prepare a careful bibliographical account of the important descriptions of GONZALO FERNANDEZ DE OVIEDO (*Historia General y Natural de Las Indias*, 1535); BERNARDINO DE SAHAGUN (1499–1590), NICOLAS MONARDES (1508–1588), and FRANCISCO HERNANDEZ (1517–1587). Again Doctor MOLL's indicated large material is unfortunately unduly condensed and undocumented in his accounts of the epidemics and early physicians of Latin America.

Interesting is Doctor MOLL's account of the ritualistic teaching for and conferring of the doctorate. His discussion of the characteristics of early Latin American medical practice and fees, on the other hand, is quite extensive, but almost entirely unsupported by evidence. His account of Latin American hospitals is well organized and well illustrated.

Doctor MOLL's discussion of foreign influences in developing effective medical work through Latin America is well arranged. The development of medicine in Latin America since independence is broadly discussed, with particular reference to teaching reforms, and a consideration of the rise of the various medical specialties. The new hospitals, laboratories and institutes, and national leaders, are discussed. Consideration is given to the development of public health matters and particularly to Pan-American cooperation in the development of effective medical and public health practice throughout the Western Hemisphere. For much of this successful cooperation Doctor MOLL himself is responsible.

DOCTOR MOLL concludes that medicine in Latin America tends still to be an individual rather than a collective effort. His generous wishes for continued successful development of medicine in Latin America are to be heartily endorsed.

A chronology of disease is appended to the volume in which a vast number of dates and data is condensed, without, however, giving much assurance of its accuracy. Another appendix comprises a long medical and general chronology for Latin America, in the style of FIELDING GARRISON, and is useful, of course, if accurate. The bibliography is arranged by countries and is not particularly exhaustive. There are both name and subject indices.

As an initial effort in English, Doctor MOLL's *Aesculapius in Latin America* is welcome. That it can be greatly improved is apparent on the most cursory examination. Perhaps with more leisure Doctor MOLL can offer a revision that will become the authoritative historical source for material on development of medicine in Latin America.

CHAUNCEY D. LEAKE

University of Texas
Galveston

For the student of archaeology and history of Latin America, this book's title is a promise of rich feasting. The promise is not, on the whole, well kept. One gets an impression that Dr. MOLL (Ph.D., not M.D.) has been over-hasty in collecting the data for the historical background of his purely medicinal material.

On page 35, for example, he speaks in a very unsatisfactory manner of the Inca PACHACUTEC. Sir CLEMENTS MARKHAM and many others have held that this Inca sovereign was the greatest individual genius ever to be produced by the native race of America. Certainly, he was a noteworthy philosopher, an admirable ruler, and a man of highest intelligence and moral force. Yet Dr. MOLL, though speaking of him several times, does him wrong in giving a very incorrect version of the great Inca's famous and beautiful deathbed saying. The correct version of it could easily have been found in various books, old or recent, of which he makes no mention.

Again, in his chapter on "The Cronistas" (why not either 'The Chroniclers' or 'Los Cronistas'?), Dr. MOLL fails to mention several of the chief

Chroniclers, thereby impairing his knowledge and his text not a little. At the same time, Dr. MOLL does rather less than justice to the medical and surgical knowledge and achievements of the native peoples of America. What he does tell us is so interesting, so well told, and in general so valuable that the reader cannot help wishing that there were more of it, and better documented, at that.

For example, the chapter on "Autochthonous Diseases" (pp. 56–64) could be much improved by adding to it consideration of the work done by such medical writers of to-day as Dr. CLEMENTE PALMA and Dr. JULIO TELLO, both of whom have contributed to our knowledge of native-origin diseases, including syphilis and the like.

Thought-provoking, but again insufficiently documented and too brief, is Chapter 17, "Doctorship" (pp. 111–113). Here, if not elsewhere in his book, Dr. MOLL did have a splendid chance to tell us what it was about medical and surgical practitioners in Colonial Peru that caused one of the greatest poets of the time (Don JUAN DEL VALLE Y CAVIEDES) to hate them so violently and to write about their profession so sarcastically, not to say so scurrilously. The sad thing is that Dr. MOLL fails to give us any real insight into the causes of the poet's ire against doctors.

Admirable, so far as it goes, is Chapter 21, "Hospitals." Here, as in the rest of the book, the illustrative material is copious and well chosen. We are given many data on hospitals, their staffs, and their methods. But, oddly enough, we are told nothing at all about the extraordinary hospital history that took place in CUZCO, the ancient metropolis of the Incas, in the period following upon 1550. At that time and place, men and women of the native race especially, besides other people, were provided with hospital equipment of both medical and surgical kinds. Had Dr. MOLL read those passages on it that he might have found in Father MONTESINOS's *Anales del Perú* (written in 1643 or so), he might have made this valuable chapter even richer and more complete than it is.

Coming down to more recent times, we find that Dr. MOLL's history of medicine in Latin America is adequate as a broad treatment of the subject. For one thing, he shows that even in that so-called 'backward' part of the world medical science does progress and evolve. It even makes, through the work of its own sons and that of men of foreign origin, valid and highly valuable contributions of its own, for which all humankind should be grateful.

But even here, Dr. MOLL's treatment could be much more full and much better documented than it is. The great yellow-fever epidemic in northern Peru in 1919, for example, and the splendid work then done by General W. C. GORGAS, Dr. HENRY HANSON, and others from our country ought to have at least a couple of pages devoted to them. As it is, they receive only the briefest notice in the text and in the Appendix of the book.

Historical investigators, especially historians of medicine, must long be grateful to Dr. MOLL for having written this pioneer work (in English) relative to the medical aspect of our general subject. It is to be hoped, however, that Dr. MOLL, or others, in later works in this intricate field, will take greater care to develop the native and the Spanish backgrounds of history, to document them more fully and more pertinently, and to avoid some of the long lists of medical names, imperfectly explained as to their historical significance in many cases. At the same time, the growing inter-relationship between Latin American medicine and North American medicine — including interchange of students — should be more greatly emphasized. Leading Latin American medical men are coming in ever greater numbers to this country to study in our hospitals and medical schools; and, no less, our medical men are going south to study tropical and other diseases in their native haunts.

All this is but one aspect — though an important one — of the increasing usefulness of the northern and southern halves of America to one another. Books like that of Dr. MOLL, and those of his successors, will inevitably give powerful aid to the tendency as a whole.

PHILIP AINSWORTH MEANS
[April 3, 1892 — November 24, 1944]

FREMONT RIDER: *The Scholar and the Future of the Research Library: A Problem and Its Solution.* xiii+236 pp. New York, Hadham Press, 1944.

In the history of the science and art of human communication, the present decade will be memorable for two events: the publication of this book and the appearance of ALBERT BONI's Readex. If, as is possible, other and more important developments in this field are occurring in the armed forces, they are still shrouded in military secrecy.

Reading machines for *microfilm*, most of them large boxlike structures casting the magnified image on a ground-glass screen, are fairly common. The Readex is the first machine commercially offered for the similar enlargement of *microprint*. For use in this new instrument the Readex Microprint Corporation, in New York, has already published the

Church Catalogue, the British Sessional Papers, and other works, printing 100 pages, in 10 rows of 10 small images each, on both sides of a 9 x 6 inch sheet of paper. In a "cradle" or shallow tray at the bottom of the machine this sheet is inserted, and by reflected light the enlarged image is cast upon the ground-glass screen. Four knobs control very simply the illumination, magnification, and focus, and permit the almost instant location of any desired page out of the hundred.

I have described this machine in some detail because it is a direct answer to the assertion, already made by some, that the RIDER proposals are visionary. On the contrary, they are immediately practicable on a wide scale by means of the BONI equipment.

In brief the new proposal is to print by microphotography on the back of the usual 3 x 5 catalogue card the text of the work that is described on the front. The device is almost childishly simple, but its possibilities are revolutionary to contemplate. Unless for sentimental or other reasons the library wanted to keep it, the original printed book could now be thrown away. Gone at a stroke is any need for binding, labeling, shelving, and storing the original book. Gone is the whole complicated system of call numbers by which a book is found — or all too often not found — on demand. Now, as soon as one locates a wanted item in the catalogue, there also is the text on the back of the card. For all practical purposes *the catalogue becomes the library*, and every person who consults it has the equivalent of a "stack permit" — that most cherished and valuable of all library privileges.

For good measure Mr. RIDER throws in another revolutionary suggestion. Why not add to the face of the card, after the usual entry for the name, title, imprint, etc., an indication as to the author's position and standing and as to the scope and perhaps also the quality of the work? Librarians have consistently omitted from their catalogue cards any such critical evaluation. This could be had only from bibliographies, periodicals, and book reviews. If we now add this to the front of the card while adding the text to the back, we shall have as a result three things in one: a card catalogue, a critical bibliography, and a collection of books.

That there are difficulties and unsolved problems in such a proposal goes without saying. The presentation in this book is a masterpiece of constructive imagination — lucid, orderly, full of sprightly humor and philosophical penetration. Nevertheless it leaves many technical questions unanswered — some perhaps by intention. For example, can some kind of handy "viewer" be developed which, without removal of the card from the catalogue tray, will allow the text to be scanned? Can the cards, if printed on one side and photographed on the other, be prevented from bending or curling as does the ordinary picture postcard? Will the increased wear and tear on the catalogue justify the use of a better grade of paper or even of plastic or plasticized cards? These and dozens of other practical questions will be answered only through actual experimentation, by the method of trial and error.

There is one technical question which must be settled before experimentation, under present conditions, can begin. What shall be the reduction ratio? Mr. RIDER mentions the possibility of such a reduction that 200 to 250 pages of ordinary print may be placed on a 3 x 5 card. This is a tremendous concentration, but the technicians assure me that several times that reduction is possible and the text can still be read back. However, though the technical means for such processes exist, they are not on the market. With the Readex as the only machine which libraries — and opulent scholars — can buy, we are practically confined to reductions between about 10 and 16 diameters for ordinary printed or mimeographed matter. A scale larger than 1 to 10 is likely to produce images too wide for the screen, not permitting whole lines to be read without shifting. A scale smaller than 1 to 16 yields images too small and indistinct for sustained reading.

These, therefore, at least until after the war, are apparently our practical working limits. They will allow something like 30 to 70 pages of ordinary printed or mimeographed material per card. Items of less than the minimum will simply not fill up the possible space. Items of more than the maximum will have to be marked: "Continued on next card." This is no serious hardship. The Readex "cradle," designed to accommodate a 9 x 6 sheet, will of course allow three 3 x 5 cards to be inserted together, so that a book of 100 or more pages can be represented in the machine at one time.

No one supposes that the system of microcards will supplant ordinary books and periodicals for current use, but for certain types of research materials it seems especially well adapted. It should greatly facilitate the handling of separate periodical articles, doctoral theses, and government documents, all of which come near to being blank spots in most library catalogues. It can also be employed to record old and little used materials, which pile up in research libraries at a disconcerting rate. But there is one use for the microcard which some scholars may view with mixed feelings. Mr. RIDER suggests using it,

not merely to reprint certain classes of material, but also to issue initially many of the publications of specialists. Some scholars will not enjoy seeing their books in such a form. Imagine an aged and eminent author saying to a visitor, "Let me present you with a set of my collected works," and handing him 17 cards!

No reader of *Isis* will be surprised to learn that this invention involves questions of historical priority. As Mr. RIDER himself points out, his idea is "the marriage, as it were, of two familiar concepts," namely, the card catalogue and the microphotographing of documents. In 1940 that "tiny connecting methodological link," the idea of the microcard with the text on the back, came to him. Had he any predecessors? Is this a new discovery or one of those cases of rediscovery with which the students of the history of science are so familiar?

In 1933 Dr. L. BENDIKSON, of the Henry E. Huntington Library, published in the *Library Journal,* an article entitled, "When Filing Cards Take the Place of Books." He suggested putting on 5 x 8 cards 20 photographic frames, each containing either one page or two confronting pages of a book. To read these back he recommended a low-power binocular microscope with a magnification of about 7 diameters. "In this manner," he says, "it will be possible to reproduce an entire Elizabethan quarto on two prints of the size of a 5 x 8″ filing card, and the principal works of that literary period, or of any other, can be brought together into a filing unit of a few drawers, and be as readily at hand as the entries in a card catalog." This is very close indeed to the idea of the microcard, but the "tiny connecting methodological link," the idea of putting the prints on the back of the 3 x 5 card, is lacking.

So far as one can discover from his book, which lacks an index, Mr. RIDER is not aware of the suggestions which PAUL OTLET, the famous Belgian bibliographer, made in 1906 in collaboration with a photographic technician, ROBERT B. GOLDSCHMIDT. In Publication No. 81 of the Institut International de Bibliographie, under the title, "Sur une forme nouvelle du livre: Le livre microphotographique," these authors suggested the microprinting of 50, 100, or even 200 pages of a book by microphotography on the front side of a standard library card ("la fiche internationale") of 125 x 75 mm. (3 x 5 in.), with the title of the work in ordinary but rather fine print across the top. In lieu of an actual illustration a diagram is given of such a card, with the author's name, title, etc., at the top, followed by 72 squares to represent the microprinted pages. Unlike Mr. RIDER's sample of the Readex editions, the pages are arranged in vertical rows of six images each.

But the basic ideas are the same. The technical requirements for the reading machine (p. 9), with electric illumination, lenses, the image projected on a glass screen, and controls for the degree of magnification and for the finding of the desired page, might almost be the specifications for the Readex. And the list of advantages (p. 6) possessed by the new form of the book might almost be a résumé of the RIDER arguments: (1) light in weight and small in volume; (2) uniform in size; (3) resistant to change or decay; (4) moderate in cost; (5) easy to handle; (6) easy to consult; (7) capable of continuous reproduction, copies being struck off as demand may arise. In this new form M. OTLET hopes that a 336-page book will cost a library about 1 franc, "tout compris," whereas in ordinary library procedure such a book is subject to the following charges: 3.50 francs for the original purchase, 0.50 for binding, 0.20 for space occupied, and 0.75 for "local," i.e., cataloguing. It is instructive to compare these with the RIDER figures of $.95 for the acquisitional cost of an average book, $.40 for binding and physical preparation, $.75 for storage (capitalized), and $1.05 for the cost of cataloguing (p. 31). The marked discrepancy here in acquisitional cost is due to averaging in, along with the cost of books actually paid for, a great number of books which the Wesleyan Library receives free.

It should not be supposed that M. OTLET is impressed merely by financial economies and the saving of space. He views his "livre microphotographique" as an instrument in the development of a universal bibliographical apparatus, by means of which the literature, past and present, national and international, on any subject, shall not merely be indexed and abstracted but actually put in the hands of any worker in the same field (p. 5). Mr. RIDER says almost the same thing in different words: "A century ago it was possible for a teacher to get the entire literature of his field within the four walls of his study, and possible to do so at a comparatively modest cost, too. After a century interim, microcards make this scholarly ideal again realizable" (p. 187).

As to historical priorities, what then shall one say? Here in M. OTLET's pamphlet of nearly forty years ago are most of the basic ideas of the microcard system, except that he did not suggest using the back of the card or adding a bibliographical annotation. In 1911, in Publication No. 113 of the same series, he discussed "Le livre microphotographique: Le bibliophote ou livre à projection," and in 1925, in

No. 144, "La conservation et la diffusion internationale de la pensée: Le livre microphotique." Both of these, however, deal with microfilms in roll form and with the machines for reading them. So far as the published literature goes, the idea of microprinted cards seems to have disappeared. Nevertheless, Dr. GEORGE SARTON informs me that in 1918 or 1919 M. OTLET was still enthusiastic about his system. "When I was in Florence, October–November 1919, I was full of it and explained it to GUIDO BIAGI, director of the Laurenziana, who was horrified," writes DR. SARTON. Dr. VERNON TATE in 1939 talked with M. OTLET in Zurich and saw some of his cards, but cannot say whether any of these had the text on the back.

A somewhat different system of microprinting is described by JAMES G. HODGSON in the *Journal of Documentary Reproduction* for 1938. He used 5 x 7 inch cards. On the left-hand third of the card he put the call number, a slightly reduced copy of the title page, etc., all in a size that could be read without a machine. He then filled the rest of the front and all of the back with 20-diameter reductions of the text, thus accommodating somewhat more than a 500-page book on a single 5 x 7 card. This is another and very interesting approximation to the microcard. Mr. HODGSON at least has thought of turning the card over and using the back.

Nowhere, however, among any of these forerunners do we find precisely that choice and combination of ideas which make the RIDER microcard so simple and inevitable. Now that it has been suggested, many persons must be saying to themselves, "Why, I might have thought of that!" But apparently nobody did. The name of FREMONT RIDER seems destined, therefore, to go down in history as the discoverer of that "tiny connecting methodological link" which bids fair to revolutionize a great deal of library practice.

The Office of Price Administration has recently issued in a preliminary edition a bibliography of nearly 1000 of its printed, multilithed, and mimeographed publications to the end of 1944. Many of the items were issued for limited circulation and the editions are exhausted. No research library is likely to secure a copy of all of them, and few libraries will ever secure half of them. Such materials have no general appeal, but for specialists in economics they are of importance. The history of price control during the emergency cannot be understood without them — nor, of course, understood completely with them. They will need to be supplemented by much other material. Desiring to present to historical scholars and research libraries the materials for an unbiased appraisal of its work, the Office of Price Administration is considering the issuance of this bibliography in the form of microcards. It has already begun negotiations with the Library of Congress for the cataloguing, printing, and distribution of the cards through the unmatched facilities of that institution for such work. It is recognized on both sides that such an undertaking is in the nature of an experiment, but from it valuable experience should result for the future development of the new technique.

WILLIAM JEROME WILSON

Office of Price Administration